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Wolf River Reservoir Plan Again Deferred

New Counter Proposal For State Controlled Project Opposes Charter To Build Private Reservoir For Fox River Mills—Acquisition of Union Falls Power Stopped—Mills Observe Two-Day Holiday — Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., July 10, 1939—Attempts of the Wolf River Reservoir Company to obtain a charter from the Wisconsin Legislature to erect a power control reservoir for paper mills of the Fox River Valley have met with new opposition. A new counter proposal is before the Legislature at the instigation of Senator Michael F. Kresky of Green Bay, Wis., in the form of a bill to create the "Wisconsin-Wolf River Reservoir Corporation" as a public agency. His idea is for the state to take over all power rights on the Wolf River, the tributary of the Fox River where flood waters were to be held in storage, and eventually develop dams and hydro-electric plants, the profits to go to the state.

Original Bill Differs From New Proposal

The original bill of the Wolf River Reservoir Company did not contemplate the generation of electric power directly, but only to add to the efficiency of Fox River Valley Power sources by providing a more uniform water supply during the summer drought period. Senator Kresky maintained there is "danger in turning over this waterway and its tremendous resources to private capital."

It is believed the senator's bill will not carry, since the Legislature previously blocked a plan supported by the Consolidated Water Power and Paper Company and others for creation of the Wisconsin Development Authority, a state-owned corporation to build additional reservoirs and power plants on the Wisconsin River tributaries. The feasibility of the private corporation's plans for the Wolf River development is attested by the existence for many years of the Wisconsin River Valley Improvement Company, a non-profit corporation maintained by paper mills of the Wisconsin River Valley to operate a series of reservoirs and dams. Each dam owner pays a proportionate share of tolls levied semi-annually and approved by the state, to maintain the system, whose worth as a means of supplying uniform water power has been effectively demonstrated.

Acquisition of Union Falls Power Deferred

Acquisition by the Wisconsin Michigan Power Company, Appleton, Wis., of the Union Falls dam and hydro-electric plant of the Oconto River Power Company at Oconto Falls, Wis., has been stopped temporarily by the appearance of two other bidders. The utility wanted the plant to supplement its power supply to the Fox River Valley.

Approval has been given a $100,000 federal loan to the Northeastern Electric Cooperative to purchase the plant. There are indications also that the city council of Oconto Falls is interested in the purchase for development of a municipal electric utility.

The matter of authority to purchase now rests with the Wisconsin Public Service Commission, which will determine the Wisconsin Michigan Power Company's contention the purchase is being made for public convenience and necessity.

Repair Dike at Consolidated Mill

A dike of the Consolidated Water Power and Paper Company's mill pond at Wisconsin Rapids, Wis., is undergoing repairs by a mill crew after water had broken through beneath the masonry of a retaining wall. The water forced an opening 4 by 8 feet in size before the flow could be stopped with sandbags. As a result, the city's swimming pool was filled with rock and silt and must be cleaned out. E. E. Belter, Consolidated Power engineer, estimated water was escaping at 300 cubic feet per second.

Mills Observe Two-Day Holiday

Practically all of the paper mills in Wisconsin had a two-day shutdown last week to give their employees the benefit of a vacation July 3 and 4. They were all back in production Wednesday.

Kimberly-Clark Plans Annual Picnic

Plans are all completed for the annual picnic of employees of the Neenah, Wis., mills of Kimberly-Clark Corporation. It will be held Sunday afternoon, July 16, at Lakeview mill park, under auspices of the Lakeview Recreation Association. Clyde Smith has been appointed general chairman of arrangements. The day will be featured by basket lunches, baseball and other recreation, and a concert by the Lakeview mill band, directed by Lester Mais. Balloons will be sent bearing tags with names of picnickers.

Seasonal Quiet Reported By Chicago Trade

Three-Day Holiday Over July 4th Slows Down Wholesale Paper Market In Middle West—Demand For Most Grades Continues Steady, Market Reported Firm — State Legislature Fair To Paper Trade — Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., July 10, 1939—The paper industry went into the mid-summer months in a most unimpressive way. The three-day holiday last week, which found many firms closed from Friday to Wednesday, put some crimp in demand while vacations combined with general quietness in business to make the period uneventful. Local reports indicate some improvement in the retail business and there are any number of cases where paper executives will point to indications of expansion that will lead to a genuine upturn in the near future.

Sulphite papers were in fair demand during the week with all grades remaining firm and demand comparatively steady. Bonds and ledgers in general moved along quietly. Groundwoods were reported as experiencing a slight decline in demand which was discounted as seasonal. Newsprint offices here were likewise reported quiet. Kraft executives were not pleased with the picture presenting the paradox of good demand but a price which made it difficult to procure a profit of any sort. Books and covers were quiet with little or no change in the underlying market structure. Waste paper continues soft representing a rather general over supply in this market.

Ruling on Wood Pulp Creates Interest

Much local interest is aroused over the Interstate Commerce Commission suspension order covering the reduced 21 cent rate on imported woodpulp from North Atlantic ports to Central Freight Association destinations which was to become effective July 3. It was contended by the eastern railroads, in the report prior to the suspension of the reduction that the 2 per cent reduction from the 23 cent basis was necessary to enable their competing with woodpulp from Europe moving to Montreal and from there by steamers to Great Lake ports and thus delivered by motor truck to interior paper mills.

Bermingham & Prosser's Annual Calendar

Bermingham & Prosser makes a dual trip to Chicago buying offices this week, first with the annual calendar and, second, with an announcement concerning Peacock Folding Enamel. Printed on 80 lb. White Dull Finish Folding Enamel, the announcement calls attention to the fact that "printing, as an agent of advertising, shoulders a large portion of the demand for increased sales." The copy further describes the usefulness of Peacock in providing sharp, clean impressions and true reproduction. The calendar is the gallery of "Famous Women of America", a splendid work of craftsmanship which fits in well with previous issues by the well known paper jobbers.

Salesmen Plan Golf Outing

The midwest division of the Salesmens Association of the Paper Industry, while it is taking the golf at Bob O Link on July 21 in stride, is beginning now to make the August outing at the La Grange Country Club the real "record breaker." The LaGrange party on August 25 will find the paper salesmen and their guests cavorting over the home course of Jim Coy and Jack Burrus, two of the most popular of the craft. It takes little imagination to look forward to many a quip and dig at these two golfers after the paper gentry has plied and ploughed its wares over the sporty LaGrange course. Golf chairman Crafts is planning several special announcements to make in connection with the August 25 outing which will have many side attractions. Meanwhile, though trying to get away on a vacation, Mr. Craft is urging his fellow salesmen to stick at home and take the day off on July 21 for the third outing at Bob O Link.

State Legislature Fair To Paper Trade

The Illinois Legislature adjourned on June 30 with a record comparatively fair to the paper industry and to Illinois business in general. Virtually all experimental legislation—including a proposal for a 5 day week, Baby Wagner Act, State Wage-Hour measure, anti-injunction and labor spy—failed to receive more than scant attention from the Illinois solons. Agreed amendments to the Illinois Unemployment Insurance Act, agreed amendments to workmen's compensation statutes providing an average increase of around 10 per cent and extension of the sales tax at 3 per cent until 1941 represented the major developments of the session. A trucking act passed which will only slightly affect the paper industry, insuring it, incidentally, against any wild cat operations which might be harmful to the legitimate industry.

Link-Belt Decries "Investigation"

The Link-Belt Company presents a challenge to America in recent communications describing Senate resolutions which have been presented in Congress authorizing and directing an investigation of labor-saving and labor-displacing machinery and for other purposes. The Link-Belt Company takes this proposal as a definite menace to mechanization, "the very thing which has made America the envy of the world." It proposes to urge the entire industrial world to do all within its power to refute propaganda striking at labor and time saving devices which have "made it possible for millions to purchase merchandise for a few cents which is counted as a luxury in other lands." The communication from the suppliers to the paper industry likewise points out the usefulness of the World's Fair exhibits of Link-Belt in illustrating the true advantages of mechanization and calls for concerted action to set up a defense for "modern America."

Vancouver Kraft Corp. Formed

The Vancouver Kraft Corporation Ltd., timber merchants and pulp mill operators, have been incorporated at Victoria B. C. under the Provincial Companies' Act. Registered offices are at 922 Standard Bank Building, Vancouver B. C. and capitalization is shown at $705,800.

Ontario to Prosecute Container Producers

Labor Minister Rogers Announces Prosecution of Reputed Combine of Container Manufacturers Will Start Immediately—Selling Price of Shipping Cases Declines — Governments Working To End Proration Dispute.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., July 10, 1939—Prosecution of a reputed combine of paper board container manufacturers will be undertaken immediately, Labor Minister Rogers of Ottawa announced lately. J. C. McRuer of Toronto has been appointed by Justice Minister Lapointe to take charge of the prosecution, which, it is expected, will be carried on in Ontario. Offices of the Container Association are in Toronto and most of its members are in Ontario.

Attorney-General Gordon Conant of Ontario says that the province would not initiate any prosecutions in connection with the matter, for reasons which included the proceedings already instituted and carried out by Dominion authorities and the fact that the reported combine operated in several provinces.

The prosecutions, which may be made either under the Combines Act itself or section 498 of the Criminal Code, which is of the same general tenor, arise from a report made last March by F. A. McGregor, Ottawa, Commissioner of the Combine Investigation Act.

Exports of Pulpwood from Patented Lands

Since the lifting of the embargo on the export of pulpwood from crown lands, exports of pulpwood from patented lands in Algoma, Ontario, has dwindled to almost nothing.

For, so far as Algoma is concerned, not only do the settlers and the holders of patented lands in the district suffer, but employment in the district has not been balanced by a corresponding export from crown lands. What export there has been under the new regulations, has come from other districts. Export of pulpwood from patented lands in the Algoma area was for many years a source of considerable revenue to the district, revenue which is now for the most part cut off.

Selling Prices of Shipping Cases Decline

Since April 1, Hinde & Dauch Paper Company of Canada, Ltd., Toronto, has suffered a further decrease in selling price of shipping cases of 10 per cent and on the company's principal board production, another one of three per cent, L. F. Winchell, vice-president and general manager, Toronto, states in a letter to shareholders with the quarterly dividend. While company believes the bottom of decline on these items has been reached, it is impossible to anticipate when any relief will be felt. However, the situation has been considerably alleviated by the many plant improvements made during the past few years. "Basically we are in splendid shape," Mr. Winchell declares, "to take fullest advantage of any recoveries effected in either price of volume and are looking forward hopefully."

Governments Working on Proration Plan

With as little publicity as possible, negotiations are quietly going forward between the Ontario and Quebec Governments and representatives of the Canadian newsprint industry in an effort to solve what at one time threatened to be a stalemate in the proration dispute.

"While it is understood no tangible formula acceptable to all disputants has been arrived at yet, those in a position to benefit most are more confident than ever that those newsprint producers who are currently exceeding their quota will be allowed to carry on at least for the current year, it is rumored.

"Shipments of Great Lakes Paper Company, Fort William, which have led the opposition to a rigid proration scheme have since the first of the year been averaging a shade under 65 per cent of capacity, as against a production for the industry as a whole of well under 60 per cent. If this company's current contracts are not interfered with, it is expected that over the whole year it will operate at about 70 per cent of capacity comparable with 1938 average of about 67 per cent.

Higher Costs Affect Abitibi Earnings

Abitibi Power and Paper Company, Toronto, is feeling the effect of a lower price for bleached sulphite pulp and higher costs of pulpwood this year. The result has been that earnings for the past two months have been lower than in the corresponding months of last year in spite of gains in shipments of both newsprint and bleached sulphite. Cumulative total for five months, however, is still 6.56% above 1937 levels. This time last year the price of bleached sulphite pulp was $60 a ton and earlier it had been $70 a ton. Now it is only $50. This $10 a ton reduction means substantially lower profits from this section of the business. In the fall of 1937 when it looked as though newsprint companies were going to experience rising business for the coming months, there was considerable competition to obtain adequate pulpwood supplies. The result was that prices for wood rose. Then when the expectations of better business failed to materialize the wood cut last year was reduced by all companies.

Paper and Pulp Exports to Britain

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., July 10, 1939—Import figures from the United Kingdom show that in 1938 paper products imported from Canada amounted to a value of £2,318,631, representing 19% of the total. Of this, 54% was represented by newsprint. The remainder consisted of wrapping paper, cardboard, wall board, etc. The latest figures of Canada's exports to the United Kingdom show that May exports of newsprint to that country had a value of $565,511; wrapping paper, $18,921; wallpaper, $1,394; wall board, $53,555; newsprint side-rolls, $34,569; paper board, $263,249; and other manufactures of paper, $74,797. Pulp exported to the United Kingdom in May included bleached sulphite $290,484, and unbleached sulphite, $80,622.

Scott Paper Co. To Redeem Part of Bonds

Redemption of $500,000 of Its 3¼ Per Cent Convertible Debenture Bonds At 105 On Sept. 1, 1939, Announced By Scott Paper Co. — Technical Graduates in Industry—James Andrews Dead—Other Late Market News.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., July 10, 1939—Scott Paper Company, Chester, Pa., has elected to redeem $500,000 principal amount of its 3¼ per cent convertible debenture bonds at 105 on September 1, 1939.

The company reports that as of the close of business July 1 there was outstanding only $1,662,000 of the original $4,000,000 principal amount of these bonds, issued March 1, 1937. Of the $2,338,000 of bonds retired, $2,290,000 of bonds were converted into common shares.

Each $1000 bond is convertible into twenty-five shares of the company's common stock. The called bonds are convertible up to and including the fifth day prior to the redemption date. Since the fifth day in this case falls on Sunday, called bonds are convertible up to and including Monday, August 28, 1939. Uncalled bonds will be convertible upto March 1, 1942.

Technical Graduates in Industry

Approximately 150 new graduates of American technical schools will join the DuPont Company during the summer, the company's Personnel Division announced a day or two ago.

Collectively, they will represent more than 45 universities and colleges, including many of the country's leading institutions of higher learning. They come from most of the states and are about evenly divided between large cities and small communities.

If the next 13 years follow the precedent set by the last 13, the division states, about three out of every four of the group will still be in the DuPont employ in 1952, at which time many of them will be at work on projects and products now unknown.

The company reports 1939 has been a good year for the technical graduate. In addition to the 150 employed, it has engaged 35 technical school men temporarily at its exhibits at the New York and San Francisco World's Fairs and at Atlantic City. Some of these men, it hopes, will be permanently retained. The typical graduate who found employment with the DuPont Company in 1939 was: In the upper third of his class; active enough outside the classroom to have had varied human contacts; of good appearance and health; with understanding of the value of money; with previous part-time working experience.

Procedure of Selecting Applicants

In rating candidates, points which influenced the Personnel Division included energy, command of English, initiative in conversation, aggressiveness, personality, poise, and manner. The interviewers also sought answers to such questions as to whether the candidate inspired confidence, seemed determined, and the degree of his intrest in the work he had chosen to undertake. Both first and final impressions were noted.

The company announces that its 1939 college recruiting program is now complete. Visits to college will be resumed in the fall to interview 1940 candidates.

Pennsylvania Salt Co. Declares Dividend

Pennsylvania Salt Manufacturing Company, declared a quarterly dividend of $1.25 per share, payable September 15, to stock of record August 31. This will make a total of $4 paid or declared so far this year as compared with $3.25 for the same period in 1938.

Paper Merchant Reports Better Business

Nathaniel Saxe, head of Saxe Paper Company, reports business for the first six months of this year showed a marked improvement over the same period for 1938, pointing out that sales volume was better but profits less. Mr. Saxe with Mrs. Saxe and their son Joe and daughter Natalie have opened their summer cottage at Lavallette, New Jersey.

James Andrews Dead

James Andrews, who was a co-founder of the Schuylkill Paper Company in 1925, with Fred S. Balch, passed away on Friday, July 7th.

"Jim" as he was familiarly known, was vice-president of the Philadelphia Paper and Cordage Association, and was very actively interested in the Association until about a year and a half ago when, because of failing health he was confined to his home. He was also a member of the Meridian Club.

Surviving Mr. Andrews are his widow, Edith Kenderdine Andrews, and a son James, Jr., a member of the Philadelphia bar.

Funeral services were held this afternoon from his late residence, 620 Carpenter Lane, Mt. Airy.

T. A. Richmond Returns from S. America

Returning with his son, Thomas A. Richmond, from a South American tour, Julian Richmond, president of Potdevin Machine Company, Brooklyn, N. Y., brings back a report of general optimism and progress.

Indicative of South America's rapid growth, said Mr. Richmond is the modernism of its cities with their subways, wide streets, tall buildings and up-to-date ports.

Mr. Richmond reports that in the Argentine, Uruguay and Southern Brazil particularly, a feeling of enthusiasm and confidence in the future exists among business men.

Mr. Richmond found a need and desire for modern equipment among paper mills and converters. The superiority of American-made time and labor saving machinery is generally recognized, he said, especially in automobiles, typewriters, radios and refrigerators.

During his trip, which covered over 13,000 miles, Mr. Richmond visited several Potdevin-equipped paper bag making and printing plants some with machines furnished over 15 years ago.

Financial News of Pulp and Paper Industry

Bagley & Sewall Ownership Transferred To Abe Cooper—Minnesota & Ontario Not To Liquidate Investments Now — Champagne Paper Corp. Announces Incorporators — Champion Nets $446,648 — Other News.

New York Stock Exchange

High, Low and Last for the Week Ending July 12, 1939

	High	Low	Last
Armstrong Cork Co.	37½	35¼	37½
Celotex Corp.	11½	10¾	11½
Certain-Teed Products Corp.	7⅓	7	7⅓
Certain-Teed Products Corp., pf.	30	28½	30
Champion Paper & Fibre Co.	19⅛	19	19⅛
Champion Paper & Fibre Co., pf.	100	98	98
Congoleum-Nairn Co.	23¾	22½	23¾
Container Corp. of America	10¼	9⅛	10¼
Continental-Diamond Fibre Co.	6½	6⅛	6½
Crown-Zellerbach Co.	10¼	9½	10¼
Crown-Zellerbach Co., pf.	81	77	81
Flintkote Co.	20⅜	18	20⅛
Robert Gair	2⅛	2	2⅛
Robert Gair, pf.	8	7⅝	8
International Paper & Power	8½	7⅞	8½
International Paper & Power, pf.	32⅜	29½	32⅜
Johns-Manville Corp.	70½	67	70½
Johns-Manville Corp., pf.	128	128	128
Masonite Corp.	39½	39	39¼
Mead Corp.	7¼	7¼	7¼
Mead Corp., pf.	56	56	56
Paraffine Companies, Inc.	46	46	46
Ruberoid Co.	21	20	21
Scott Paper Co.	51	49¾	51
Scott Paper Co., pf.	116¼	116¼	116¼
Sutherland Paper Co.	26	25½	26
Union Bag & Paper Corp.	7¾	7¼	7¾
United Paperboard Co.	4¼	4⅛	4⅛
U. S. Gypsum Co.	85½	82	84½
U. S. Gypsum Co., pf.	176	175½	175½

New York Curb Exchange

High, Low and Last for the Week Ending July 12, 1939

	High	Low	Last
American Box Board Co.	6	6	6
St. Regis Paper Co.	2⅛	1⅞	2⅛
St. Regis Paper Co., pf.	38¼	38¼	38¼
Taggart Corp.	2⅞	2¾	2⅞

Bagley & Sewall Transfer Completed

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., July 10, 1939—The actual transfer of the ownership of the Bagley & Sewall Company to Abe Cooper took place last week at the offices of the Northern Trust Company where the 30,000 shares and $60,000 deficit and certain obligations was paid over to representatives of the old stockholders. The Merchants National Bank and Trust Company, of Syracuse, assumed an interest in the proceedings by taking over half of the $130,000 mortgage heretofore held by the Northern New York Trust Company. The latter concern will continue to hold half of it. After completion of the transaction the new owner announced that the directors had decided to make Harry C. Kinne vice president to fill the vacancy that has existed for some time since the resignation of Edward S. Lansing. Mr. Kinne has been secretary and sales manager for some time. Clarence E. Kinne will continue as president and general manager and Carroll L. Thompson, treasurer, will also take over the secretary post. While the new owner will be an important factor in the company he reiterated his statement of several weeks ago that he would hold no official title. He will, however, be one of the directors.

Although not having title to the company until this week the new owner has been taking an active part in its affairs since it was known that he would take over the property. As a result it is announced that business is slowly improving and the working force has been enlarged. Among those participating in the transaction were Mr. Cooper and the Northern New York Trust Company, represented by Attorney Charles Phelps; representatives of the Watertown National Bank; Attorney Roswell E. Taylor, representing Edward S. Lansing and Miss Madeline Bagley who with Mrs. V. K. Kellogg represent the Bagley interests; Virgil K. Kellogg, general counsel for the company, also representing the interests of Mrs. Kellogg; J. Reginal Stebbins, representing the Sewall interests.

M. & O. To Continue in Present Form

C. T. Jaffray, R. H. M. Robinson and S. M. Archer, trustees of the Minnesota and Ontario Paper Company deem it desirable to continue the business of the company in its present form rather than attempt to liquidate the principal investments and properties of the debtor. The finding is contained in a statement forwarded to creditors of the company.

On a consolidated basis the debtor company and its subsidiaries, exclusive of European subsidiaries and the National Pole & Treating Company, appear to have adequate working capital to carry on operations pending and following reorganization providing the reorganized company does not take on the burden of fixed interest charges or at least not too great a burden of such charges. This finding is based on the assumption that approximately the present volume of business and price structure for its products will continue.

The European operations under present conditions represent a self-sustaining unit, although without adequate working capital, the trustees found.

Taylor Appointed Vice-President

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., July 10, 1939—John F. Taylor has been appointed a vice-president of the E. B. Eddy Company, Ltd., Hull, Que., following his retirement as secretary and sales manager after 59 years of active service with the company. He remains a director and as vice-president his advice will be available to the company at all times.

"There was no paper being made by the firm at all when I started," Mr. Taylor recalls. "Mr. Eddy had a large sawmill and even then employed 600 hands."

Beginning as office-boy at 50 cents a day, the new vice-president became company telegrapher, then cashier and ledger-keeper. More than 30 years ago he was appointed sales manager, and since that time has travelled extensively in Canada.

The fire of 1882 which destroyed most of the Eddy plant, and the still greater conflagration which wiped out most of Hull and part of Ottawa in 1900, are vivid memories to Mr. Taylor. "Disasters such as these would have been enough to make most men give up in despair," Mr. Taylor says, "but Mr. Eddy

started to rebuild on both occasions almost before the ashes were cool."

Salesmanship is of great importance today because of the wide variety of products on the market, Mr. Taylor comments. "I sometimes wonder if the average person realizes the great usefulness of a salesman's daily work."

Announce Champagne Incorporators

BREVARD, N. C., July 10, 1939—Harry H. Straus, president of the Ecusta Paper Corporation, John A. Sherman, Eben C. Gould and Inez D. Descoucey are subscribers to stock of the Champagne Paper Corporation which has recently been granted a charter in this State.

Although the corporation will maintain headquarters at the plant of the Ecusta Paper Corporation, the two concerns are independent endeavors and have been previously situated in New York State, it was explained at the office of the Ecusta Corporation.

Champagne Paper Corporation is authorized to manufacture, fabricate, export, import and deal in paper under $115,000 authorized capital. The four incorporators subscribed to $1,000 worth of stock.

Champion Nets $446,648

The Champion Paper and Fibre Company and Subsidiaries for the year to April 30 reported a net profit for the fifty-three weeks' period amounted to $446,648, equal to $5.76 each on 77,483 shares of $100 par, 6 per cent cumulative preferred stock. This compared with $1,557,439, or $1.98 each on 551,000 shares of no par common stock, in the preceding year after dividend requirements on the preferred stock. Current assets as of April 30, 1939, including $873,582 cash, acounted to $8,981,356 and current liabilities were $1,862,654, compared with cash of $810,188, current assets of $9,565,026 and current liabilities of $1,936,690 on April 24, 1938. Inventories were $5,605,770, against $6,441,815.

Marathon To Redeem Bonds

APPLETON, Wis., July 10, 1939—A call has been officially issued by the Marathon Paper Mills Company, Rothschild, Wis., for the redemption on November 1 of $1,750,000 of its first mortgage bonds. Owners will be permitted to deposit the bonds at any time now and receive the face value, plus accrued interest and premium ranging from ½ to 1½ per cent if called before maturity. The company is refunding the issue with new bonds at lower interest rates, as well as to obtain additional working capital.

Strathmore Declares Dividend

The Strathmore Paper Company declared a dividend of $2.50 a share on the 6 per cent preferred stock on account of accumulations, payable July 15 to stockholders of record June 30. After the above disbursement, dividend arrears as of July 1 will amount to $17 a share.

Port Huron Pays $1 Dividend

Port Huron Sulphite and Paper Company paid the regular quarterly dividend of $1 on the 4 per cent participating preferred stock on July 1 to date of record June 24.

Gair Co. Celebrate 75th Anniversary

The Robert Gair Company, Inc., which started in business as a paper firm in a loft on Reade Street on July 7, 1864, last week celebrated its seventy-fifth anniversary with ceremonies at its plant in Piermont, N. Y., 800 employees participating.

Meanwhile, in the executive offices, at 155 East 44th Street, company executives unearthed from the files the first page of the first sales book kept by the late Robert Gair, a captain in the Union Army, when he opened his business career.

A dozen pen-and-ink entries, in spidery, old-fashioned handwriting, showed that the captain on his first day booked orders for paper worth $913.10. These ranged from a single ream of "white packet post plain" called for by William D. Roe & Co. of 63 Wall Street, for which the new company charged $4, to an order worth $355 from C. S. Garrett & Brother, 12 Decatur Street, Philadelphia.

For this sum Captain Gair, the book shows, supplied "50 rms., 24 x 38, 27A, pink," at $7.10 a ream. A company executive yesterday hazarded a guess that this was what was known after the Civil War as "tea paper," used for wrapping.

Last week's celebrations included a parade led by forty employees of the company with records of twenty to forty-two years of service. The plant manager, Harry van Decker, and Mayor Dennis Hogan of Piermont were speakers.

Michigan "Supers" To Meet July 25

An extensive fun program has been arranged for the first Annual Summer Meeting of the Michigan Superintendents by the committee in charge, composed of Frank Eilers, chairman, assisted by "Buster" Griffiths and Walter Hadley.

The entire facilities of the Kalamazoo Country Club have been turned over to the superintendents and their guests for the "jamboree."

The program will start with a golf tournament at 1:00 P. M. and those not interested in golf will be provided with several forms of entertainment which the committee has decided to keep secret. Prizes will be awarded after dinner which will be served at the Club House at 7:00 P. M.

Chairman Ray Barton urges all members of the Michigan Division to attend this fun meeting and extends a cordial invitation to technical men, engineers, purchasing agents, and sales representatives of the allied industries to attend. A special invitation is extended to officers and members of the Miami Valley and Northwestern Divisions to come to Kalamazoo July 25 for the occasion.

Advance ticket sales will be handled by Arnold Weller of the Sutherland Paper Company.

R. H. Morrill Made General Manager

HOLYOKE, Mass., July 10, 1939—Ralph H. Morrill was promoted to the position of general manager of the Chemical Paper Manufacturing Company at a meeting of the directors held here recently. He was also elected director and vice-president. He has been assistant treasurer and manager since 1920.

Mr. Morrill came with the Crocker McElwain Company in 1912 as bookkeeper and worked up through the ranks. In 1920, he was transferred to the Chemical Paper Manufacturing Company.

Glycerine in Paper*

By Georgia Leffingwell[1] and Milton A. Lesser[2]

Abstract

Glycerine's unique combination of physical and chemical properties is used in the manufacturing and processing of paper, "to keep paper soft, to give body, to increase germicidal power, to soften, to prevent shrinkage and to improve paper flexibility." Newer developments include these and other applications. The glycerine-phthalate resins are finding use as coating, impregnating, laminating and strengthening agents for paper and fiber board.

Every paper chemist and producer is familiar with many varied uses of glycerine which are now standard procedures in the paper industry. It is therefore not necessary to dwell more than briefly upon these accepted uses. New and important applications of glycerine will be found not so much in text books or technical manuals, but rather in current research and industrial literature and more particularly in patent reports and specifications. An examination of these latter sources readily reveals how widespread the use of glycerine has become in all types of paper processes.

The paper industry values glycerine for its many unique properties, some characteristics being more important, however, than others. Reviewing rapidly, glycerine is a clear, viscous liquid with a sweet taste. The fluid varies slightly in color, depending upon the purity, from a pale yellow to a clear water-white. The specific gravity of the pure fluid should not be below 1.249 at 25 deg. C., but this value also varies with the degree of purity of the product. The high boiling point of glycerine, which prevents evaporation and its low freezing point, which prevents brittleness in low weather extremes are also considerable factors. Glycerine is fully miscible with water and alcohol, but does not mix with benzene, ether, chloroform and similar organic solvents and with certain oils. Especially notable is the solvent action of glycerine. Many substances which do not dissolve readily in water or in alcohol can frequently be made to go into solution with glycerine and may then be combined with the other fluids, if desired. Another valuable property of glycerine, is its safety when used in the various paper processes. The handling and application of this fluid offers no hazards to the workers or equipment, either through toxic fumes or corrosive action. This is an important factor, since these undesirable properties are so frequently associated with many of the newer industrial solvents and similar substances.

Probably no property of glycerine is more important, from the papermakers' angle, than its hygroscopicity. Through this ability to absorb and retain moisture, even up to 50 per cent of its own weight under certain conditions, glycerine owes its value as a plasticizer for paper to maintain softness, flexibility and pliability. This same moisture-retaining characteristic is widely utilized to control the moisture content of paper products to help obviate such undesirable effects as shrinkage, curl, buckle, "dishing" and the like. The use of the proper quantities of glycerine often eliminates the need for racking the papers to adjust their moisture content prior to printing or other practices.

For industrial purposes glycerine is obtainable in various grades—chemically pure; industrial pale straw; industrial white, etc.—according to the purpose for which it is required. Pure glycerine itself does not ferment or turn rancid.

One of the most firmly established uses of glycerine is in the preparation of glycerine-litharge cements. Because of their high resistance to the combination of heat and moisture and because of their high resistance to the action of dilute acids, these cements find wide employment for lining the digesters or sulphite liquor tanks. The glycerine-litharge cements may be used for the facing or lining or can be employed for cementing the special bricks or tiles. Kingsbury *(1)* recommends the following proportions: 5¼ pounds of 90 per cent pure glycerine and 23 pounds of litharge to make a cubic foot of the cement. When combined, these set in a very short time and increase in hardness during several days. These glycerine-litharge cements for use in sulphite pulping equipment are frequently mixed with powdered glass, quartz, silica, andesite and the like.

A new use for glycerine has been suggested in a recent Swedish patent for the treatment of cellulose waste lye. In a device for indirectly cooling the masses from the soda melt furnaces, glycerine is used as the medium. *(2)*

Use in Pulping Processes

Another important use for glycerine in the early stages of paper manufacture is the employment of this fluid in the isolation of cellulose in ligneous materials. This application of glycerine is discussed in quite some detail by H. A. Bromley in his technical manual, "Paper and Its Constituents." Here it is pointed out that while Cross and Bevan's chlorination method is now generally accepted as the most satisfactory method of isolating cellulose in ligneous materials, this process is sometimes criticized on the ground that part of the residual cellulose is impure, in that it contains a furfural-yielding complex. Bromley states that this complex may be removed by hydrolysis of the fibers with a mixture of glycerine and acetic acid. This mixture is made from glacial acetic acid and glycerine (specific gravity 1.260) in the proportion of their molecular weights (60:92) and the reaction carried out at a temperature from 135-140 deg. C. by the Johnson and Hovey method. This reagent has the specific advantage in that it does not attack the cellulose itself. Japanese studies *(3)* on the isolation of lignin from bamboo find the use of glycerine most advantageous. In these studies it was found that lignin was most effectively extracted by treating the bamboo with 25 per cent glycerine at 150 deg. C. for four hours at *p*H 9. X-ray photographs of the isolated glycerine-lignin indicated that there was no evidence of crystalline structure

Recent European studies on the digestion of plant fibrous materials with polyhydric alcohols indicates more important uses for glycerine, which is one of the most important of these organic compounds. In

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[1] and [2] Glycerine Producers' Association, New York, N. Y.

these experiments, straw of oats, barley, rye and wheat, wood shavings, reeds, and potato plant tops were digested with glycerine and aqueous glycerine solutions, with or without the addition of organic and inorganic acids. The reactions were carried out at from 135 to 160 deg. C. under pressure of from 1½ to 2½ atmospheres for twenty to thirty minutes. The ratio of cooking liquor to raw material varied from 20:1 to 33:1. The cellulose yields were about 50 per cent on the basis of the raw materials. The addition of mineral acids, it was found, tended to decompose and carbonize the residue. The employment of organic acids such as acetic or formic acid speeded up the digestion. The residue could be easily defibered after digestion. The addition of an equal amount of water to the glycerine resulted in better pulps than were obtained with glycerine or other alcohols alone. The pulp yields and digestion periods were, however, the same for both the aqueous and non-aqueous pulping agents. The viscosity of the pulp obtained with aqueous solutions was somewhat higher than that of the pulp digested with the alcohol alone. *(4)*

Use in Treating Paper

Glycerine enters extensively into the formulation of sizing preparations and impregnating agents and emulsions. To prevent the wrinkling of sized papers, the addition of glycerine offers many decided advantages. The wrinkling and other untoward reactions of sized paper, when it becomes very dry, is attributed to the fact that the size in the paper has a greater shrinkage coefficient than the paper itself. To prevent this unequal contraction, the addition of quantities of glycerine to equalize the size shrinkage is advocated. The moisture-absorbing qualities of glycerine increases the hygroscopicity of sizing agents. A British method for incorporating the necessary solutions or suspensions into the pulp stream immediately before its passage into the paper-making machines through open nozzles is quite interesting. Delivery of the materials such as rosin, size, casein, sodium silicate, glycerine, dyes, glue, alum fillers, etc., is controlled by adjusting the hydrostatic head of the solution above its nozzle. *(5)* Paper containing hydrated cellulose uses the action of glycerine to maintain the pliability. The process for including the hydrated cellulose may be combined with sizing by resin or by paraffin. The pliability of the precipitated web may be obtained by adding glycerine during or after manufacture or by incorporation in the hydrated cellulose. Further processing renders such paper waterproof. *(6)* An American method, producing paper products of good flexibility, specifies impregnation with a solution containing a substantial proportion of sodium silicate, glycerine and soap. The paper is subsequently treated with oxalic acid or aluminum sulphate to convert a substantial proportion of the silicate into reaction products and then, dried. *(7)* Another newer process for making coating and impregnating compounds consists of dissolving treated chitin in an aqueous acid solution. Glycerine and other substances are added. The compound is advocated for use in tub sizing and beater sizing of paper, for the treatment of rosin sized paper and similar procedures. *(8)*

By far the greatest use for glycerine is in the manufacture of a large variety of specialty papers for standard and unusual purposes. Glycerine enters into the composition of many coating compounds particularly those which render the paper greaseproof or waterproof or both. Paper can be greased-proofed by first treating it with a heated mixture of glycerine and starch in a gelatinized condition. This is applied to the paper as a plastic layer and a layer of greaseproof material is laid over this. *(9)* A very similar process for making washable, greaseproof paper suitable for covering tables, walls and the like requires that laminated paper, the uppermost layer of which has been strongly resin-sized, be coated on this layer with a concentrated gelatin solution containing glycerine. After a hardening treatment, this layer is further treated with a waterproof heat-resistant lacquer. *(10)* A thermoplastic surface can be given to paper by means of a material containing cellulose acetate. Prior to the application of this material, however, the paper base is treated with 0.5 to 10 per cent of glycerine, which in addition to acting as a plasticizer, is here used because it is a non-solvent for the acetate at ordinary temperatures. *(11)*

Glycerine enters extensively into paper and paper products used for wrapping and packaging foods. The safety of glycerine in connection with edible products need not be discussed here. It is sufficient to say that eminent medical *(12)* and research *(13)* authorities have definitely proven and established the complete lack of toxic or other dangerous effects in the utilization of glycerine in connection with foods. Nothing can be in more intimate contact with foods than the casing on a sausage. Recently, a method for making such a casing from paper specifies the use of glycerine as a plasticizing agent. In the last steps of treating these cellulose ether-coated tubes, they are passed through a bath containing glycerine prior to final drying. *(14)* As might be expected, grease- and waterproof papers for wrapping foods often contain substantial amounts of glycerine. Such a paper, which is also transparent, may be made by impregnating a highly calendered sulphite paper with glycerine. It is then coated with albumin, casein, gelatin, etc. *(15)* Another method that renders paper waterproof requires that this material be dipped or sprayed with a preparation containing a solution of a colloid, such as joinery glue or gelatine, a plastifier such as glycerine and an insolubilizing agent such as formaldehyde. *(16)*. Bennett *(17)* presents a patented formula for rendering paper resistant, not only to moisture and grease, but to acid as well. The following treatment is recommended. The paper is impregnated at 60-65 deg. C. with an aqueous solution containing pure gelatin 13, Irish moss 6.5, hide glue 3.25, glycerine 8.25, acetone 0.375, sodium benzoate 0.125, potassium alum 2, sodium alum 1, 37 per cent formaldehyde 0.5. All ingredients are on a weight-percentage basis. The paper is dried and then treated with a solution of one pound of 37 per cent formaldehyde and one ounce of glycerine in one gallon of alcohol. Flameproof and moisture resistant coated papers may be made by impregnating the fibers with a flame proofing compound containing ammonium sulphate protected by a network of glycerinated gelatin and is provided with a waterproofing rubber coating. The paper thus produced is suitable for wrapping, making bags or boxes, etc. *(18)*

Papers containing, or coated with rubber or its compounds frequently utilize the plasticizing and softening action of glycerine. Because of their rubber content these rubber-containing papers are usually resistant to grease and moisture. A flexible, non-tacky coating is formed when paper is treated with an

aqueous dispersion of approximately 23.7 per cent of rubber latex, casein, modified starch, a filler such as clay, glycerine as a hygroscopic plasticizing agent and about 4.7 per cent of shellac. These papers are especially suited for wrapping foods. *(19)* In another method for coating paper, a compound is used which contains rubber solids of an aqueous rubber dispersion among other ingredients, and to which glycerine is added as a non-colloidal hygroscopic agent. *(20)* In a newer procedure for creating transparent, flexible, moisture-resistant coatings on glassine paper, glycerol abietate, made by the interaction of glycerine and rosin acids, is used together with chlorinated rubber and other ingredients. *(21)*

It should also be pointed out that glycerine is widely employed in the manufacture of glassine papers. In one example, glassine paper is plasticized with a material comprising glycerine, dextrose and sodium nitrate. This is incorporated in a partially dried web of paper on the driers and a further amount of the plasticizer is incorporated after the web has been completely dried and during the moistening of the web prior to supercalendering. *(22)* when an aqueous solution of "cerelose" (corn sugar) is used for treating paper to produce a glassine or imitation parchment paper, the patent states that glycerine may also be used. *(23)*

In making relatively transparent, soft sheets of waxed paper, one method employs the beneficial action of glycerine. In this process, a paper sheet is formed on a yankee fourdrinier machine from bleached pulp that has been "medium well" hydrated, but insufficiently hydrated to render the paper greaseproof. The paper is plasticized with 2.5 to 10 per cent of glycerine after being dried on the yankee drier. The glycerine plasticized paper is dried and is then moistened and supercalendered. *(24)* A waxed paper suitable for wrapping foods is made by providing one side of a smooth-surfaced paper suitable for printing with a background coating consisting of an adhesive vehicle such as starch paste together with glycerine and pigments such as lithopone or the like. The paper has a water content of 35-45 per cent. The paper is dried, printed upon with an oil-base ink and then passed through a bath of wax. *(25)*

Vegetable Parchment and Tissue Papers

In a discussion of vegetable parchments, Sheldon Leicester in his text, "Practical Studies for Paper Manufacturers" points out that many vegetable parchments, particularly the thicker varieties, which are apt to be somewhat hard and brittle, require softening and should be made more pliable by treatment with some hygroscopic substance. He recommends glycerine as the agent most suited for such purposes. He also indicates that, "In some cases where, for economy, invert sugars are used instead of glycerine for softening parchments, moist warm atmospheres will cause them to mildew and discolor. A microscopic examination will determine the presence of the fungus."

In their, "Textbook of Paper Making," C. F. Cross and E. J. Bevan describe a process for making vegetable parchment which utilizes glycerine to prevent the brittleness which would ordinarily result from the total drying of the product. In this procedure, a pure cellulose paper (waterleaf) is passed through a bath of sulphuric acid, varying in strength from 53 to 60 deg. Baumé. After passing through the acid, the web of paper is at once plunged into water to arrest the action of the acid and determine the fixation of the reverted cellulose as a semi-fibrous colloidal aggregate. It is particularly stressed that the web must be exhaustively washed at this point to remove the last trace of the acid. Prior to drying it is treated in a bath of glycerine and glucose and then dried on drying cylinders. To permit the application of a varnish, Champsaur *(26)* advocates that parchment be treated with glycerine as a suppling agent. Dextrine is included with the glycerine as a size and calcium chloride may also be added as a thickener.

Glycerine is frequently utilized in the manufacture of creped papers and tissue papers. This inclusion increases the strength of these specialty items, heightens their absorbent properties and helps to maintain them in a soft, supple condition. One simple expedient for making paper soft and cloth-like requires only that the paper be dipped in a 10 per cent aqueous solution of glycerine and then dried. *(17)* Other methods, however, are a bit more complicated. Absorbent cloth-like paper can be made by adding viscose to substantially unglazed paper stock at any stage of paper manufacture, including the bulk paper stock and the dried sheet of paper. This is then treated with glycerine as a softening agent. *(27)* Creped tissue paper with alpha-cellulose fibers in open formation, have these fibers bonded with a thin film of albuminous adhesive with the use of a large proportion of glycerine as a softening agent. *(28)* Another paper product which contains cellulose derivatives, a hydroxy ether, is used for making towels, napkins or the like because of its high absorbing power. Dense paper, paper containing rosin, wax, etc., may be coated with a viscous solution of the ether. Pliability is increased by the use of glycerine, which may be anhydrous to avoid redrying the paper. *(29)*

Tissue paper, such as that made from spruce pulp, to be used for making bed sheets, pillow cases and such, is made strong, supple, soft and absorbent by saturation with the following solution: glycerine 1, alcohol 2, and water 3 parts, this mixture containing 5.5 ounces of talc per each six gallons of solution. Paper so treated is passed through wringer rolls and dried. *(30)* Absorbent paper for use as toweling or for similar purposes may be given a high wet strength without much loss of absorptivity by impregnating with a dilute solution of an albuminous adhesive, which contains glycerine as a softening material. *(31)* Creped paper is strengthened by passing a web of paper through a bath containing glue, glycerine and rubber latex. As the web emerges from this bath, it is sprayed with a solution containing formaldehyde which serves to form a hardened surface on the web. *(32)*

Papers for use in highly specialized work very often employ the unique combination of properties inherent in glycerine. In the manufacture of decalcomania, register is always a major problem. The paper must not change in length or width during the processing and the film upon it must neither contract nor expand. Here the use of glycerine is most important. The paper used by the decalcomania maker is a very porous material. This is coated by the paper manufacturer with a water-soluble coating of starch, albumin and glycerine. Such paper is known as "single" paper. "Double" paper is similarly coated but consists of a thin tissue backed by a heavy supporting sheet which may be easily separated at the time of application. A recent development in decalcomania is a steel engraving print on the top of the transfer body which has its paper base treated with a water-

soluble adhesive containing glycerine. In addition, according to this patent, a vegetable wax such as Japan wax is included in the adhesive solution. *(33)*

Other examples of unusual or special paper products reveal the versatility of glycerine's usefulness. The manufacture of duplicating papers utilizes large quantities of glycerine as a softener. A patented instance for treating card or paper stock for use in duplicating processes requires that the material be superficially treated with a specified glycerine mixture. This treatment imparts hygroscopicity only to the faces of the paper materials. *(34)* Stencil papers, too, are glycerine treated to impart durability, strength and flexibility. The following patented coating is typical; nitrocellulose 12.6, acetone 225.0, alcohol 135.0, resin 2.7 and glycerine 45.0 parts. *(17)* Another compound for application as a stencil paper coating consists essentially of a cellulose ester such as cellulose nitrate in combination with a camphor-bearing oil, glycerine and formaldehyde. *(35)* Another instance of a paper coated with a cellulose derivative, this time to form a highly reflecting surface, is one in which glycerine is specified as the plastifier. One example of a coating given in the patent consists of nitrocellulose, acetone, methyl alcohol, glycerine and water. The solvents are removed by volatilization leaving behind the glycerine-plasticized cellulosic film on the paper. *(36)*

An improved cigarette wrapper offers unusual appeal, especially to non-smokers. A zone of the wrapper is impregnated with a mixture comprising water-glass, glycerine, starch and talc. This treatment serves to prevent the smouldering of discarded cigarettes. *(37)* Paper may be reinforced by placing threads, wet with glycerine, between two sheets of paper. These sheets united after treatment with an adhesive made from starch. *(38)* A chemically prepared paper for use in automatic telegraphy may be made by soaking the paper in this solution: ammonium nitrate 2 lb., potassium ferricyanide ½ oz., gum tragacanth 2 oz., glycerine 2 oz., and water ½ gallon. *(39)*

A recently developed method for making felted wood pulp utilizes glycerine in the processing. Wood pulp is treated with an oleoginous material such as rape seed oil, phenol and glycerine, having the property of localizing liquid absorption. It is then carded, felted and treated, as by the use of starch treated layers, to form within the felted pulp a stratum adapted to retard the penetration of liquid from one side to the felt and insure more complete distribution of liquid throughout the pad. *(40)*

Glycerine is widely used as a plasticizer for adhesives of all sorts. For example, metal sheets and paper can be united by a mixture of aqueous adhesives and aqueous dispersions of polymerized compounds. One such mixture contains gum arabic, glycerine and acrylic acid testers. *(41)* Such metal-paper bonded materials should suggest many interesting possibilities. Another adhesive for securing paper to glass, metals, and the like consists of glue 100, glycerine 400, and calcium chloride 37 parts, used together. *(42)*

The Glyptal Resin

Within the last decade or so, synthetic resins made with, or containing glycerine, have reached great prominence not only in paper treatments but in many other lines of endeavor. Particularly important among these glycerine-containing resins are the alkyd or glycerine-phthalate resins, frequently referred to as glyptal resins. New effects, new finishes, new products have been made with the employment of these synthetics. These glyptal resins have made it possible to create strong, tough papers with dull or glossy, flexible or stiff finishes that can be made opaque, translucent or clear, as desired. These finishes show high resistance to many solvents, to oils and to weathering. The glyptal resins are essentially the condensation products of glycerine and phthalic acid or anhydride. The straight resin is a clear, hard, pale yellow, glossy substance. These, however, can be modified in a variety of ways to meet a variety of needs, by variation in the basic condensation procedure, by the use of other acids and by the addition of one or more modifying substances. *(43)* Many of these resins can be so made as to be compatible with nitrocellulose and similar coating lacquers, and other resins, both synthetic and natural. The alkyd resins are employed as agents for coatings, impregnations, bondings and laminations. A combination of glycerine, phthalic acid, resin lacquer and a pigment is suggested to produce a glazed finish on paper *(44)* Modified glycerine-containing resins, many of them compatible with nitrocellulose, are employed to render paper greaseproof. Many patented modern examples of such usage for the alkyd-type resins are readily available. *(45-46)* Particularly valuable applications for papers treated with these resins have been found in packagings for foods, especially those which are of an oily or greasy nature. Other modifications of these resins are produced to create other desirable finishes. One product for example is used as a varnish on paper to give not only grease resistance, but water resistance as well. *(47)* A resinous condensation product of glycerine and a benzophenone dicarboxylic acid is used as an ingredient of a liquid coating compound. This compound is used to produce flexible films on paper. *(48)* A newer development combines cellulose acetate with a glycerine-phthalic acid synthetic resin to produce compounds for coating paper and the like. The process specifies the necessary softening point, acid number and other essential data relative to the special glycerine-containing resin used in this coating combination. Other ingredients and solvents are likewise given. *(57)*

The glycerine-containing glyptal resins likewise find many applications in specialty papers. In his discussion of lampshade paper manufacture, Meier *(49)* points out that for the more expensive shades that are to be impregnated with artificial resins, a paper from refined pulp containing about 95 per cent alpha-cellulose is required. Glyptal resins are used in the finishing of these papers to avoid yellowing on exposure to light. A patented process which gives practical application to this information specifies a method for making transparent, heat-proof and light-proof papers for lamp shades. These are made by impregnating unsized paper with a fused mass containing alpha-cellulose and a light- and heat-resisting resin of the glycerine-phthalic acid type and subjecting the product to polymerization by heat. *(50)*

A rather unique application for an alkyd resin is the use of such a product in methods for protecting fibrous products such as bank notes or the like from imitation. In this process, rayon is treated with a fluorescent dye by a given procedure. The rayon is fixed with an acetone solution of the condensation products of glycerine and phthalic acid, cut up into small pieces

or ground to a powder and then added to the paper pulp. *(51)*

Glycerine and its resinous combinations also find valuable applications in the manufacture of heavier paper products such as fiberboard, paperboard and the like. The use of the glycerine-containing resins is particularly valuable in connection with the heavier paper products. Papers for making shipping containers are frequently coated with these resins to increase their handling resistance while in transit. The well known weathering ability of these resins is an important element when shipments are exposed to adverse climatic conditions. When particularly strong, stiff, cardboard is desired, it is frequently fortified by lamination or impregnation with the glycerine-phthalate resins.

Containers made of laminated paper can be greaseproofed by coating the internal surfaces with a film formed of animal glue 1, glycerine 0.1-5, formaldehyde 0.5-5 and water 2-15 parts. This film is heat-treated to a suitable reaction temperature to render the coating insoluble. *(52)* A similar composition is used to make cartons for oil and such. The container for oil, having a body portion formed by winding two or more layers of a cellulosic material such as chipboard, is coated internally with a combination of sodium silicate, glycerine and gum arabic to which dextrine, soap and sodium carbonate may be added. This coating may also be applied to the outside of the carton. The patent also gives directions for making the container waterproof as well. *(53)*

Estimation of Glycerine in Paper

Since glycerine enters so extensively into the compounding and treatment of paper and paper products, several dependable chemical methods are available for the determination of this fluid in these products. Methods for chemical analysis are available in any of the standard paper textbooks. The following method, for the detection and colorimetric determination of glycerine is however worthy of mention. This method is especially useful when glycerine is in admixture with other water-soluble substances and when glycerine is in great dilution. In the example given parchment paper, containing 1 to 5 per cent of glycerine was used. One gram of the paper was extracted with three successive 30-cc. portions of water and the extracts diluted to 100 cc. A 2-cc. aliquot portion is heated to 170 deg. C. with 4 cc. of 0.1 per cent anthrone in concentrated sulphuric acid. The reddish yellow color produced is characterized by marked fluorescence that is intensified by the addition of further amounts of sulphuric acid and which never occurs when other water-soluble substances, excepting acrolein or compounds leading to its production, are present. Glycerine, in dilution of 0.002 mg. per cc., may be detected by this reaction which depends upon the interaction of anthrone with acrolein and oxygen to form benzanthrone. Very dilute aqueous extracts lend themselves well to colorimetric determination of glycerine by the above procedure. *(54)*

Glycerine likewise enters extensively into the equipment and reagents for testing paper products. The Mullen tester for determining the bursting strength of paper employs glycerine as the pressure transmitting fluid. Microscopic methods for studying paper fibers, which have become increasingly important within the last few years, employ glycerine as a suspending medium for the teased papers and as an ingredient of the dyeing and staining solutions. Glycerine enters into the composition of reagents for microscopic fiber analysis *(55)* and for the microscopic detection of rosin in pulp. *(56)* Many other standard as well as newer paper laboratory test materials contain glycerine as an important ingredient. Many instances of such uses will be found in the current literature.

Summary

In this review an attempt has been made, by particular reference to the more recent literature, to show that not only has glycerine's usefulness kept pace with the rapid growth of the paper industry, but also that the employment of glycerine has aided materially in this progress. The wide versatility of glycerine in this industry is well witnessed by its frequent inclusion in newly developed processes. Not only does the unique combination of desirable properties make glycerine a valuable substance, but its ready availability, its safety and its adaptability to many uses in the paper industry intensifies its worth. There can be no doubt that glycerine will continue to advance in usefulness as the paper industry goes forward.

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Obituary

William J. McLane

William J. McLane, 42, president of the Auburn Cordage and Twine Company, Inc., Auburn, N. Y., and vice-president and secretary of the Logan Paper Company, Inc., died unexpectedly July 1 at his home 16 Tuxill Square.

He had been ailing three days. His death came as a shock to relatives and a wide circle of friends.

He was a veteran of the world war and prominent in veterans' circles in Auburn. He also was a communicant of St. Alphonsus church and a member of Auburn Council 207, Knights of Columbus. His wife, Mrs. Barbara McLane, and a daughter, Miss Ann McLane, survive.

Lewis C. Sleeper

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., July 10, 1939—Lewis C. Sleeper, who was an accountant for many years for the Combined Locks Paper Company, Combined Locks, Wis., died at his home at Appleton, Wis., July 6. In recent years he had conducted a private accounting business. Burial was in Milwaukee, Wis.

B. C. Mills Practice Economies

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., July 8, 1939—British Columbia pulp and paper mills are making real progress in curtailing waste and making profitable use of by-products. Members of the Vancouver Board of Trade party, during their recent visit to Powell River and Ocean Falls, learned that market conditions had dictated a more economical production policy, with the result that many steps leading to reduction in costs and improvement in operation efficiency had been recently taken.

Officials of Pacific Mills Ltd. at Ocean Falls pointed out that their big plant was now in a position to eliminate consumption of imported fuel oil almost entirely in favor of hogged fuel, prepared from material which in the old days would have been 100 per cent waste.

The spectacle of huge refuse burners at coast sawmills converting stacks of sawdust and discarded slabs into smoke has been eliminated to some extent by the fact that the pulp and paper industry, which used to consume large quantities of fuel oil, has converted its furnaces to the use of this surplus material from the lumber mills. An important new coastwise shipping development has been the use of former sailing ships as barges in the hogged fuel trade, carrying fuel from the sawmills to the pulp and paper mills.

Pacific Mills has been experimenting with various plans for maximum use of its available power. Several years ago the mill had to curtail operations for several weeks because of a water shortage. While there is remote possibility of there being too little water this season, Pacific Mills no longer is solely dependent on hydro-electric energy as a result of recent installations.

New British furnaces and generators enable the company to save power by using the same heat for two processes in the manufacture of kraft paper, one of the chief products of Ocean Falls, selling to such distant markets as South America and South Africa.

Some of the west coast paper mills are now reserving some of their highest grade spruce for airplane lumber, since they can obtain a better price for it in that form than if passed through the chipping plant for pulping.

Powell River Company is regularly setting aside airplane stock, much of it Sitka from the forests of Queen Charlotte Islands, which during the war years produced large quantities of this material for the Imperial Munitions Board, then managed in this province by Major Austin C. Taylor. Kelly Spruce Company, A. P. Allison and J. R. Morgan Ltd. supply most of the logs.

B. C. Pulp and Paper Company will soon have its Port Alice plant in operation, following a shutdown extending back to the spring of 1938. A crew of men are now getting the west coast bleached sulphite mill ready for resumption of production following receipt of new orders, some from the Orient. The company's Wood-fibre mill has been running for several months on a daily 175-ton basis.

Handling Small Orders

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 10, 1939—Paper manufacturers and converters are finding it difficult to handle small orders on a percentage basis. This matter is one of the cost elements most difficult to control.

The Munroe Paper Corporation, Lawrence, Mass., states in a letter to customers that "Inasmuch as many of our customers are specifying direct shipments of small quantities, we find that our trucks are unable to make all of the required stops each day and many times have been obliged to return with part loads.

"For this reason, effective immediately, we are announcing an upcharge of ½ cent per lb., *with no* freight allowed, on all orders for direct shipments where the weight is less than 1,000 lbs."

The company suggests that customers strive to obtain orders for minimum quantities of 1,000 lbs. on which their regular prices will apply.

The Dennison Manufacturing Company, Framingham, Mass., has been making a 10 per cent charge on small orders, but this has created considerable confusion and entailed extra work in computing the upcharge. The company has decided to add to each order under $10 a straight 50-cent service charge which will partially offset the handling cost of the order. This policy will become effective August 1.

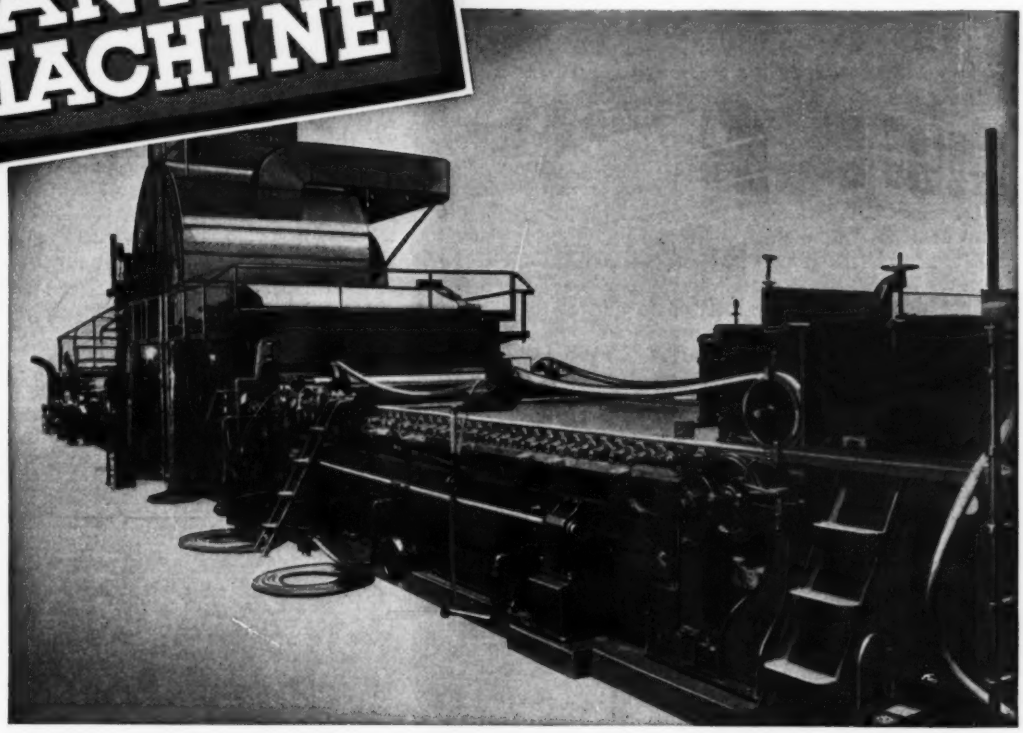
Lewis Co. Moves Sales Office

The J. P. Lewis Company has announced the removal of its central sales office on July 1 to 270 Broadway, New York, from its former address on Madison avenue. The new telephone number is Worth 2-5244. There has been no change in the address or telephone of the A. R. Melker Company, New York City, sales representative for the J. P. Lewis Company.

Fire Destroys Fallsburgh Mill

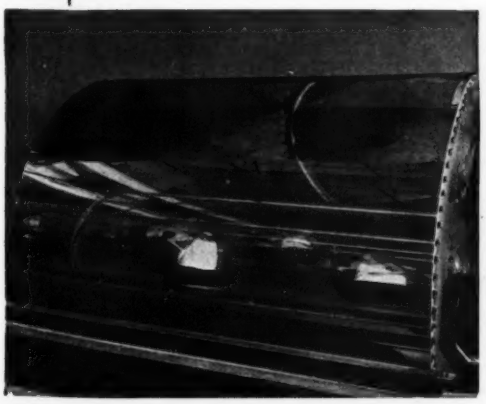
LIBERTY, N. Y., July 10, 1939—The Fallsburgh paper mill, erected about seventy-five years ago, was destroyed by fire recently. Loss is placed at $25,000. Edward LeFevre, Monticello resident, disposed of the mill several years ago to city persons.

THE Beloit YANKEE MACHINE



● The Beloit Yankee Machine furnishes an economical easy means of diversification. No other machine has the all-around adaptability to fit the needs of mills making specialty papers, both light and heavy weights.

The machine is provided with all the latest features: Removable Fourdrinier ...High Speed Super Shake...Suction Rolls...High Pressure Dryer...Hypoid Drive, etc.



Beloit has developed a special alloy metal and special grinding and polishing process to produce the close grained, hard mirror finish shown in this photograph. This is a result of Beloit's many years of experience in building practically all the Yankee machines in this country.

Beloit has also recently developed a high pressure Yankee dryer to meet the demand for maximum production.

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BELOIT IRON WORKS • BELOIT • WIS.

Champion To Expand Mill

CINCINNATI, Ohio, July 10, 1939—The Champion Paper and Fibre Company is planning construction of an addition to its Houston, Tex., pulp mill to cost an estimated $3,000,000. Time, Inc., already has agreed to take a substantial amount of the additional capacity.

At a special meeting called for August 8, stockholders will be asked to vote on a proposed increase in authorized cumulative preferred stock from 85,000 shares to 115,000 shares. If the increase is approved, Time, Inc., will buy for investment $1,000,000 of the 6 per cent cumulative preferred stock. Company will not issue any of the additional shares except those to be sold to Time.

The company also is considering the retirement of $10,007,000 of outstanding 4¾ per cent debentures through bank loans and sale of first mortgage bonds to insurance companies. Directors have been negotiating with banks for sale of $6,000,000 of serial notes to carry interest from 1½ per cent to 3½ per cent due in from one to 7 years and $7,000,000 of first mortgage bonds to insurance companies to bear 4¾ per cent, maturing from 9 to 15 years.

Proceeds from sales of these obligations would be used to retire the debentures, the company's only funded debt, and for construction of the paper mill. Remainder would be used for working capital.

The agreement which has already been signed by Time, Inc., must be approved by the company by August 30.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 12, 1939—The Government Printing Office has received the following bids for 2,000 sheets of 24 x 36 Quaker drab cloth lined cover paper; Whitaker Paper Company, $146.68 per M sheets; R. P. Andrews Paper Company, $151.86; Barton, Duer & Koch Paper Company, $149.00; Virginia Paper Company, $150; Thomas Barrett & Son, $155.00; Mudge Paper Company, $146.65.

For 67,600 pounds (400,000 sheets) of 28 x 41 dull coated book paper; Paper Corporation of U. S., 6.3 cents; Marquette Paper Company, 5.84 cents; John F. Post, Inc., 6.28 cents; Barton, Duer & Koch Paper Company, 6.26 cents; Whitaker Paper Company, 5.99 cents; Stanford Paper Company, 5.84 cents.

For 40,000 pounds of supercalendered book paper in 28½ inch rolls; R. P. Andrews Paper Company, 3.93 cents; Perkins-Goodwin Company, 4.09 cents; Stanford Paper Company, 4.56 cents; Frank Parsons Paper Company, 4.2 cents; Whitaker Paper Company, 4.48 cents; and Paper Corporation of U. S., 4.65 cents.

N. E. Paper Merchants on Outing

FARMINGTON, Conn., July 3, 1939—The festive outing of the New England Paper Merchants Association was held Wednesday at the Farmington Country Club here with about 35 members and guests attending. The very enjoyable program included golf, putting on the green, horseshoes, buffet luncheon and a dinner. Among those present were Arthur H. Chamberlain, secretary of the National Paper Trade Association, and Henry W. Stanley, secretary in charge of the Wrapping Paper Division.

Dr. Carpenter Goes To Lufkin

Dr. Charles Carpenter, technical director of the Herty Foundation Laboratory here since last August, has resigned to become associated with the Southland Paper Mills as a chemist, according to the *News* of Savannah, Ga. The company is building a new newsprint mill at Lufkin, Tex.

The late Dr. Charles H. Herty rated the 30-year-old chemist as one of the country's outstanding men in the technical field of paper making. He will take up his duties at the Texas mill August 1. The board of directors will meet soon to elect Dr. Carpenter's successor.

Dr. Carpenter came to Savannah from Pittsburgh where he was engaged in cellulose research work at Carnegie Institute of Technology.

In regard to his work at the Herty Foundation Laboratory, Dr. Carpenter said: "The privilege of working for two years under Dr. Herty will always mean a lot to me throughout my life."

Dr. Carpenter spoke with regret of leaving Savannah, stating he and his family had become "much attached to Savannah" and would "always remember it pleasantly."

Dr. Carpenter, his wife and their little daughter will leave in a few days to spend a vacation of about a month in the mountains of western North Carolina before going to Lufkin. Dr. Carpenter tendered his resignation to the trustees of the Herty Foundation recently, effective yesterday. Meanwhile, the work will continue with Donald R. Brewster as field director and George A. Ritter as plant manager.

Dr. Carpenter is a member of the Southern States Pulp and Paper Club, the Technical Association of the Pulp and Paper Industry, the Society of American Foresters, the American Chemical Society and the Canadian pulp and Paper Association.

L. D. Mahon Heads Maryland Assn.

BALTIMORE, Md., July 3, 1939—Lee D. Mahon has been elected president of the Maryland and District of Columbia Paper Trade Association for the coming year.

Other officers elected at the meeting, which was held at the Annapolis Roads Club, are: Wiley M. Baxter, Jr., and Harry W. Turner, vice-presidents; Albert P. Stevens, Jr., secretary; W. E. Snyder, treasurer; Bryce W. Gillespie, chairman, and Mrs. Snyder, Henry Hock, Arthur H. Tew, of Washington, and M. Kiesewetter, of Hagerstown, members of the executive committee. With the two exceptions, the officers are Baltimoreans.

Buys Paper Under Walsh-Healey Act

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 5, 1939—During the week ended June 24, the Government purchased $45,612.95 worth of paper and allied products under the Walsh-Healey Act. Included in these items were: Marquette Paper Company, Chicago, Illinois, newsprint paper for the Post Office Department, $20,714.55 (estimated); Bogart Paper Company, New York City, paper towels for the Navy Department, $14,448.40; and Stone & Forsyth Company, Boston, Mass., paper cups for the Veterans Administration, $10,450.00.

Book Assn. Denies Price Pact

Similiarity in prices quoted by various producers of book paper has resulted from competition and the industry does not now have nor has had any agreement to fix prices, according to testimony on July 6 by P. H. Glatfelter, president of the P. H. Glatfelter Company, representing the Book Paper Manufacturers Association. Mr. Glatfelter was called as a witness in the Federal Trade Commission's hearing on charges of increasing prices above the normal competitive level, against the association. He was examined in detail by Reuben J. Martin, FTC trial attorney, but adhered consistently to those statements.

The hearings, begun early last week at the office of the Federal Trade Commission at 45 Broadway, New York, and will resume on July 11 at Duluth, Minn. Charles H. Diggs is the FTC examiner. Mr. Martin said the hearings may continue for a year and sessions will be held at various points where the book paper industry operates.

TAPPI Notes

The Canadian Department of Mines and Resources has just issued Dominion Forest Service Bulletin 95 on "The Penetration into Wood of Cooking Liquors and Other Media" by W. B. Beazley, H. W. Johnston and Otto Maass.

The Technical Section of the Canadian Pulp and Paper Association will hold its summer meeting at the Mount Royal Hotel, Montreal, P. Q. on Thursday, September 21, 1939.

The Technical Section of the Papermakers' Association of Great Britain and Ireland will be represented by a group of forty or fifty members in a tour of paper and pulp mills in September. Visits in the United States will be made to Niagara Falls, Erie, Detroit, Kalamazoo, Chicago, Chillicothe, Washington, D. C., Chester, Philadelphia and New York.

A revised and enlarged edition of "An Outline of General Forestry" by Joseph S. Illick has just been issued. Copies may be obtained at $1.00 (paper) or $1.50 (cloth) per copy from Barnes and Noble, Inc. 105 Fifth avenue, New York, N. Y.

Prize Winners at N. E. Outing

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 10, 1939—The winners of prizes at the recent outing of the New England Paper Merchants Association, held at the Farmington Country Club, Farmington, Conn., were as follows:

Kicker's handicap, W. N. Stetson, Jr., 10 golf balls; low gross, Jack Whitney, Whitney-Anderson Paper Company, Springfield, Mass., leather travelling case; low total of five selected holes, F. G. Lockwood, 9 golf balls; low net, John F. Blackman, 3 golf balls; Horseshoe tournament, Bert Harwood, John Carter & Company, Inc., Hartford, Conn., cuff link set. Clock golf tournament, M. P. Alogna, Storrs & Bement, Dunhill lighter.

Gamble's Year Book

A comprehensive view of the rosin and turpentine markets with full information and statistics on these commodities is given in Gamble's International Naval Stores Year Book for 1939-40. This 164-page annual, just published by Thomas Gamble, Savannah, Ga., is priced at $3 per copy.

Indianapolis Demand Spotty

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., July 10, 1939—General demand for most grades of paper here seemed spotty during the last week. In the fine paper field there was some volume, but local jobbers are hardly satisfied and attribute some of the spottiness to the holiday which came during the middle of the week. Many of the larger users closed down the last of June and did not open until last Wednesday. Prices were ruling steady, however, and it is expected that more business will be done this week.

The newsprint field continues rather slow. The larger city papers are running slightly behind their lineage of last year, but the rural papers seem to be in a better condition. Again the price level is well maintained and there is no indication of change.

While demand for building paper fell off last week, there is every indication that volume will bound back this week. The first six months showed volume for building paper and roofing ahead of any year during the last ten both in the city and in rural districts. Retailers have fair stocks on hand, but apparently are ready buyers. Jobbers say inquiries continue unabated and they are expecting the late summer and fall volume to maintain the record set for the first half of the year.

Summer specialties, while not so large in volume last week, likely will be in heavy demand this week. Retailers found themselves with low stocks after the holiday and at the end of the week many of them had placed sizable orders.

Container factories opened at nearly normal production Wednesday and report a good demand. The waxed container field, particularly items for the dairy and ice cream trade, is slightly better than it was a year ago.

Demand for old rags was light during the week with no change in prices and better grades more popular. There was some firmness in the waste paper field, but local executives say there could be more improvement both in price and demand.

Lowe Paper Co. Damaged by Fire

Spontaneous combustion was blamed by company officials for the fire that did damage estimated at between $1,000 and $5,000 to waste paper stock in the warehouse of the Lowe Paper Company, River street, Ridgefield, N. J., shortly after 8 o'clock on the morning of July 3.

Thousands of dollars worth of paper stock was threatened by the blaze for several minutes until the firm's sprinkler system automatically spread water from the ceilings soon after the fire began, and until the arrival of Ridgefield's three volunteer fire companies.

F. L. Whitcher Goes to Groveton

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 10, 1939—The Boston sales office of the Groveton Paper Company, Inc., of Groveton, N. H., has sent an announcement to mimeograph users that they have added to their sales force Frank L. Whitcher, formerly connected with the A. B. Dick Company of this city. Mr. Whitcher has had long experience with all types of mimeograph duplicators and equipment and is ready at all times to assist.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Los Angeles, Cal. — The Schumacher Wall Board Corporation, 5721 South San Pedro street, Los Angeles, manufacturer of wall board products, plaster board and kindred specialties, has concluded arrangements for purchase of tract of about 12 acres of land on Firestone boulevard, South Gate industrial district, as site for new mill. It will consist of a large group of one-story units for general production, storage and distribution, with power house, machine shop and garage, administration building and auxiliary structures, estimated to cost over $1,000,000, with equipment. Plans for initial unit, totaling about 10,000 square feet of floor space, are being completed, and bids will be asked soon for general erection. This and other buildings are scheduled for completion in October, when bids will be asked for additional structures. Leland S. Rosener, 233 Sansome street, San Francisco, Cal., is consulting engineer. R. H. Shainwald is president.

Plainwell, Mich. — The Michigan Paper Company, manufacturer of book and writing paper stocks, etc., has plans under way for new addition to mill, to be one-story, 75 x 225 feet, reported to cost in excess of $75,000, with equipment. It will be used as a coating mill. Bids are scheduled to be asked soon for general erection.

Columbus, Ohio — The Ohio Wax Paper Company, 780 Frebis avenue, manufacturer of waxed and other processed papers, is arranging immediate call for bids for erection of proposed new addition to mill, recently referred to in these columns, consisting of a one-story structure, 75 x 380 feet, instead of smaller size, previously reported. It is estimated to cost close of $250,000, including equipment, and will provide for large increased capacity. L. A. DeGuere, Wisconsin Rapids, Wis., is consulting engineer. Edward Palmer is president.

Spartanburg, S. C.—The Harley Bag Company, Trade and Dunbar streets, manufacturer of paper bags and sacks, plans rebuilding of portion of plant recently damaged by fire. An official estimate of loss has not been announced.

Camas, Wash.—In connection with expansion at Camas mill of the Crown Willamette Paper Company, recently referred to in these columns, a new laboratory will be erected for the Western Waxed Paper Company, 1311 Sixty-third street, Oakland, Cal., a division of the Crown Zellerbach Corporation, 343 Sansome street, San Francisco, Cal., which operates the Crown Willamette company. Also, as previously announced, a one-story laboratory, 44 x 120 feet, will be built for the latter company, to provide a research division, 23 x 30 feet, as well as a biological room, 15 x 31 feet. The bag mill will be four-story, 42 x 225 feet. Entire project is reported to cost over $100,000, with equipment. Work will be placed under way immediately by Drake, Wyman & Voss, Fenton Building, Portland, Ore., which has the erection contract.

Dansville, N. Y.—The Berwin Paper Corporation, manufacturer of paper stocks for waxing and other service, has completed plans for new addition to mill, to be one-story, 40 x 113 feet, reported to cost in excess of $50,000, with equipment. An award for structural steel framing, including erection, has been made to the American Bridge Company, Elmira, N. Y. Other construction work will be carried out by day labor. Construction is scheduled to begin at early date.

Escanaba, Mich.—In order that a constantly improved grade of paper may be offered to its customers, the Escanaba Paper Company has just completed the work of installing a water filtration system at its plant, by which all foreign matter is removed from the water before passing through the mill.

Unfiltered water made it impossible for the mill at all times to provide a sheet of uniformity clean appearance and owing to the keen competition now faced by the mill, in the hanging, or wall paper field, it is necessary to provide the best possible sheet. The cost of the filter and its instalation will be approximately $40,000, but officials of the mill believe the product of the Groos plant will now take rank as the very best in its field.

In addition to the filtration plant the company has also completed the expenditure of approximately $20,000 in installing flat screens in the paper mill and improvements in the pulp mill, all of which were necessary to raise the grade of their product above that of their competitors.

Because of unsatisfactory conditions in the paper industry, for the past two years the Groos plant has experienced a hand to mouth existence, in that it can operate only on orders that are received from day to day, as the greater portion of its surplus storage space has been filled for many months. But in spite of this condition the average annual payroll of the Escanaba Paper Company, over a considerable period of years, has averaged approximately a half million dollars a year. In addition the company annually purchases in this district approximately 30,000 cords of pulpwood

from both farmers and jobbers, making the movement of the wood to the mill an important part of the employment for workers of both the North Western and Escanaba & Lake Superior railroads.

Throughout the depression the mill at Groos has been Escanaba's backlog of employment, for both workers in the mill, for workers in the woods and for employees of the railway companies and that the company has been able to operate continuously, in spite of highly unfavorable conditions, is a matter of great satisfaction to the people of Escanaba.

From its inception the Escanaba Paper Company and its parent company, the Escanaba Traction Company, have been forced to battle continuously for existence. The power company first constructed the pulp-mill, as an outlet for its surplus power. When companies, to whom its pulp was sold in earlier years, installed their own pulp-making facilities, the Power company was forced to construct a paper mill. The ownership of the two companies is so closely interwoven that any influence affecting one company also effects the other. The two companies, it is estimated, have an investment on the Escanaba river amounting to approximately six and a half million dollars.

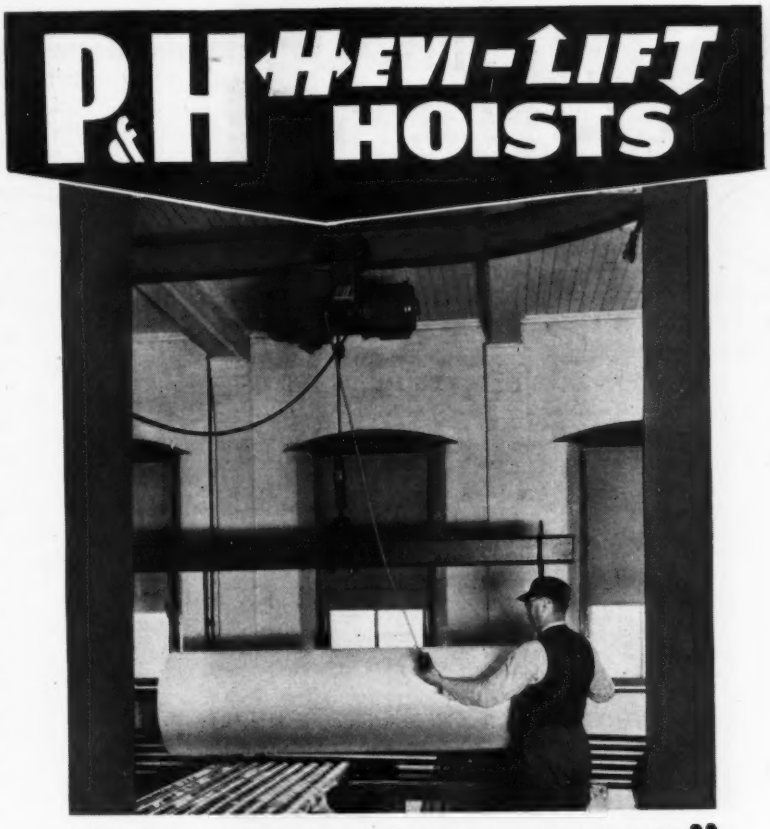
Circleville, Ohio—The Container Corporation of America, Inc., 111 West Washington street, Chicago, Ill., manufacturer of corrugated paper boxes and containers, has completed plans for new power house at branch mill at Circleville, used for straw board production for corrugating. It will be 50 x 60 feet, reported to cost over $40,000, with boiler unit and auxiliary equipment. Bids have been asked for general erection and contract will be awardedsoon.

New York, N. Y.—The Albert Paper Box Company, 75 Front street, Brooklyn, N. Y., manufacturer of folding paper boxes and containers, has leased a floor in building at 252 West Twenty-ninth street, New York, and will occupy for expansion, including metropolitan office facilities.

Lockport, N. Y.—Fire recently damaged the abandoned mill of the Niagara Paper Company, Mill street, East Lockport, practically destroying the structure. No estimate of loss has been announced.

Knox, Pa.—The United States Corrugated Fibre Box Company has begun erection of addition to branch container and box-manufacturing plant at Knox, recently noted in these columns, consisting of a two-story and basement structure, estimated to cost close to $50,000, including equipment. The Pittsburgh Bridge & Iron Works, Union Bank Building, Pittsburgh, Pa., has award for structural steel framing, and will push work to early completion. New unit will be used for increased capacity. Main offices of company are at 1409 Roosevelt avenue, Indianapolis, Ind. H. J. Lacy is president.

Tacoma, Wash.—The Pacific Match Company, manufacturer of book matches, etc., plans early rebuilding of portion of plant, recently damaged by fire, with loss reported close to $25,000, including equipment.



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EDITOR

Ronald G. Macdonald
Editor Technical Section

Lynne M. Lamm
Washington Correspondent

Vol. 109 New York, July 13, 1939 No. 2

COMING EVENTS IN PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Fall Meeting, Syracuse Hotel, Syracuse, N. Y., September 12-14.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

NATIONAL SAFETY COUNCIL, PAPER AND PULP SECTION, Annual Meeting, Atlantic City, N. J. October 16-20.

LABOR RELATIONS ACT

It would seem essential for adequate cooperation between management and labor that the Labor Relations Act must provide equitable representation of the interests of both employers and employees. From the many costly strikes and labor troubles which have arisen since the National Labor Relations Act became a law, and the widespread criticism which has met many decisions of the Labor Board, it seems plain enough that defects in the Act itself are in part responsible for failure to provide equal justness for management as well as for labor.

In hearings held by the Senate Committee on Education and Labor in 1934 and 1935, while the bill presented by Senator Wagner was under discussion, the Chamber of Commerce of the United States forecasted dissension and recommended several provisions which would remove various inequalities in the bill which, unfortunately, were not adopted. The Chamber pointed out in 1935 that, "The bill would tend to separate rather than bring together employers and employees, and would enlarge the possibilities of labor friction: The proposed board would be a partisan rather than a judicial body; Employees should be protected from coercion from any source; the chief agency of coercion was not currently the employer, against whom alone the bill was directed."

The testimony received by the Senate committee since its present hearings began on April 11, 1939, indicate the need for amendment in the present law. In reply to the Labor Board assertion that it has been upheld by the Supreme Court in 13 out of 17 cases, the Chamber states in part: "In the federal circuit court of appeal, the Board has represented it had been wholly sustained in 71 per cent of the cases. A count of actual decisions shown in the advance sheets of the *Federal Reporter* since October 1, 1938, and available to June 21, shows that in this recent period the Board was sustained in only 36 per cent of the cases."

In reference to industrial strife the Chamber points out, "The Board asserts, 'so far as industrial strife is concerned, 1938 represented not only a tremendous improvement over 1937, but also the best record in recent years.' The published records of the Department of Labor respecting strikes do not bear out that statement. They demonstrate that in the early part of 1937 there was a peak in both the number of strikes and the number of persons involved in strikes. There would be shown a still higher peak if there were complete figures for the number of persons who were thrown out of work against their will because strikes had cut off materials necessary for their work. This great increase in strikes led to the most precipitate depression the country has yet experienced. The lower number of strikes in 1938 was due to the new depression, and not to the Labor Relations Act and its administration. The economic recovery which has been under way since the middle of 1935 had at the beginning of 1937 brought the country within sight of a balanced federal budget, but the conditions of industrial strife which were engendered ended these prospects for several years, at the least.

"As for the number of strikes in 1938, the statistics published by the Department of Labor show the number was greater than in any year since 1921, except 1937, the year of the all-time peak. Besides, when economic conditions in the middle of 1938 took a turn for the better, strikes again began to increase. The Board has presented to the Senate Committe a table purporting to show that in 1937 the number of persons involved in strikes was but '3.5 per cent of the gainful workers of the country.' No statement could be more fallacious. If any such calculations is to be attempted, it should show the percentage of the number of strikers to the persons engaged in the fields in which the strikes occur. Such a percentage can be shown for the field of manufacturers, as there was a census of manufacturers for 1937 and the figures of the Department of Labor show the number of persons involved in strikes in manufacturing during 1937. When these two figures are related, it appears at once that the number of persons employed in manufacturing and involved in 1937 in strikes constituted 14.3 per cent of the number of persons employed in manufacturing in that year. That is an appalling figure, in its indication of the extent of industrial disorder."

In urging immediate amendments to the Labor Relations Act the Chamber recommends: (1) That the Board should be required to limit itself to cases in which there is a definite public interest. It should be

made to cease handling private controversies and grievances. (2) The Board combines in itself the functions of investigator, prosecutor, and judge. It has not only failed to segregate these functions within its own organization, but it has in uniting these functions added methods of procedure which are highly oppressive. Separations of functions should be provided. (3) The Act should be amended to prevent the Board from continuing its present requirement that a trial examiner, after the close of a hearing, is not only to prepare finding in fact, but is to present the remedy he considers appropriate. The examiner should be confined to making findings of fact. (4) Congress should remove all doubts about the extent of the judicial review to which defendants before the Board are entitled . . . Organizations denied recognition for purposes of an election, the parties to an election, and those whose petitions for elections are rejected, whether employees or employers, should be given an express right of appeal to the federal courts.

In reference to the petition of employers the Chamber points out that, "Since employers have been denied through regulation of the Board a right to petition to have an election by the Board to determine representatives with whom the employer is to deal, this right should be assured by express amendment of the Act."

Fort Wayne Corrugated Co. Moves Office

[FROM OUR REGULAR CORRESPONDENT]

FORT WAYNE, Ind., July 10, 1939—General offices of the Fort Wayne Corrugated Paper company, now located in the Medical Arts building, are being moved to the company's newly acquired office building on East Pontiac street, formerly occupied by the Western Gas Construction company.

As a result of a questionnaire sent approximately 9,000 customers and prospective customers of the company, The Fort Wayne Corrugated Paper company will operate on a five-day work week basis effective immediately. Replies to the questions asked by the company in the poll revealed that approximately 39 per cent of the companies operate on five-day week calendars, with 82 per cent of this number operating on a year-round basis of five days a week.

Factory operations are shut down on Saturdays in 65 per cent of the factories quizzed, with 94 per cent of this total remaining closed on Saturdays the year round.

The poll covered 12 states in the east and midwest.

Hugh Moore Heads Dixie-Vortex

Hugh Moore, Chicago, Ill., has been elected president of the Dixie-Vortex Company, Chicago, manufacturer of paper drinking cups and allied specialties, to succeed R. C. Fenner, resigned, effective July 31. Mr. Moore was formerly president of the Dixie Cup Company, prior to the merger with the Vortex Cup Company, and since which time he and Mr. Fenner have shared in the general direction of the business.

Production Ratio Report

(These statistics are based upon paper production reports to the American Paper and Pulp Association)

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1939	1938	1937	1936	1935	1934
January	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	78.4%	66.0%	87.3%	80.7%	72.3%	.....
July	.....	72.0%	81.8%	77.3%	64.9%	.....
August	.....	77.2%	82.9%	81.5%	70.9%	.....
September	.....	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	72.3%	80.6%	81.3%	70.5%	.....
First 26 weeks	81.0%	67.6%	90.0%	78.7%	69.5%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1939		CORRESPONDING WEEKS, 1938	
May 27	80.1%	May 28	71.4%
June 3	74.3%	June 4	62.5%
June 10	79.2%	June 11	64.9%
June 17	78.9%	June 18	66.1%
June 24	78.1%	June 25	67.7%
July 1	76.4%	July 2	68.8%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	May 27, 1939	June 3, 1939	June 10, 1939	June 17, 1939	June 24, 1939	July 1, 1939
0% to 50%	54	92	65	69	71	39
51% to 100%	250	208	234	225	207	95
Total Mills Reporting	304	300	299	294	278	134

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1935	62%	68%	68%	63%	61%	66%	62%
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	....	....

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1935	67%	71%	77%	71%	61%	66%
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%

Week end. May 27, 1939—66%
Week end. June 3, 1939—57%
Week end. June 10, 1939—66%
Week end. June 17, 1939—67%
Week end. June 24, 1939—66%
Week end. July 1, 1939—70%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

German Paper Production Declines

Production of paper and paperboard in Germany during 1938 was slightly less than in 1937 when a record output was reached, according to Forest Products Division, Department of Commerce.

The production decline, about one per cent, was attributed chiefly to a slackening in domestic demand. Considerable stocks from excessive purchases in 1937 were carried over in 1938.

Total production of paper and paperboard decreased from the 1937 high of 3,943,000 tons to 3,898,600 tons in 1938. Printing and writing paper production decreased 53,079 tons from the 1937 peak of 1,470,000 tons.

Production of wrapping paper and paper and paperboard, however, increased in 1938 over 1937. Wrapping paper output advanced 23,494 tons to a total of 1,081,167 tons in 1938, and paperboard production which totaled 943,305 tons in 1937 was recorded at 1,002,557 tons in 1938.

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Raw Materials

"Whole cotton," an annual source of cellulose. David Milne. Rayon Textile Monthly 19, no. 9:540-541 (Sept., 1938); B. I. P. C. 9:63.—Reference is made to research work being done at the University of North Carolina for utilizing the whole cotton plant as a source of pulp. Methods of growing by crowding rows and the plants in the rows, as well as omitting fertilizer applications, will cause all the bolls to ripen over a short period and give high yields of "whole cotton." Attempts to recover the cellulose after extraction of the oils by organic solvents were made by digesting the material by the soda, kraft, chlorine, sulfite, and nitric acid processes. Pulp with the highest alpha cellulose content was obtained by the nitric acid process; pulping with the chlorine process gave results which compare favorably with those obtained with wheat straw in Argentina.—C.J.W.

Preparation of Pulp From Rice Straw. Shungo Sugiyama and Masao Sengoku. Repts. Imp. Ind. Research Inst., Osaka, Japan 18, No. 12. 1938. 17 p. C. A. 32:8134.—The finely cut rice straw was boiled three hours at four atmospheric pressure and washed. The fiber was then treated with 3-4 per cent nitric acid (density 1.42) and 6-7 per cent sodium hydroxide. The pulp thus obtained contained 90 per cent alpha-cellulose, 5 per cent beta-cellulose, 0.3 per cent ash and had a copper value of 1.04. The hydrochloric acid procedure was also satisfactory.—C.J.W.

Bagasse Pulp for Paper Manufacture. Yoshikazu Yatsuhama. Kagaku Kogyo Jiho; Intern. Sugar J. 40.39 (1938); C. A. 32:8138.—Bagasse does not differ much from coniferous wood fiber as raw material for the manufacture of paper pulp but it contains less lignin. The sulphite process is not applicable to it but the nitrate method can be employed to advantage, giving a pulp containing not more than seven per cent of pentosan and 88-90 per cent of alpha-cellulose. For rayon manufacture the pulp is unsuitable, its fibers being too short and its impurities too high.—C.J.W.

Plants Containing Cellulose. Fritz Hoyer. Faserforschung 13, no. 3:128-145 (July 12, 1938); B. I. P. C. 9:37.—The author reviews 32 different fibrous plants from which cellulose is obtained. The difference between the requirements of the paper and textile industries is that the paper industry demands chiefly long-fibered substances, while the length of the fibers does not play a role in chemical conversion for the so-called dissolving pulps. This statement does not hold for all conditions, because short-fibered straw pulps have been used successfully in papermaking for a number of years; certain applications have only become possible through the introduction of these pulps. The article includes discussions of coniferous and deciduous trees, straw, grasses, reeds, hemp, hops, broom, etc. Sixty-one literature references are given.—C.J.W.

Relation of Growth Characteristics of Southern Pine to its Use in Pulping. C. E. Curran. Paper Trade J. 106, No. 23:40-43 (June 9, 1938).—A discussion of the influence of fast or slow growth, different amounts of springwood or summerwood in the rings, and differing amounts of sapwood or heartwood in the tree.—A.P.-C.

Wood Chemistry. X. Chemical Composition of Akamatsu *(Pinus densiflora)*. Y. Ueda and T. Ota. Cellulose Ind. (Tokyo) 13:383 (1937.—Analytical data are given, including cellulose 50.27 per cent, lignin 25.59 per cent, and loss on drying 11.17 per cent.—A.P.-C.

Japanese Forest Resources and Requirements for Timber. Ivan Elchibegoff. Paper Trade J. 106, No. 22:22-31 (June 2, 1938).—A general discussion.—A.P.-C.

Fiber of Flowers of Typha Latifolia, L. Y. Kihara. J. Agri. Chem. Soc. Japan 14:607-608 (1938).—The fiber contained 12.87 per cent moisture, 0.92 per cent total nitrogen, 5.75 per cent crude protein, 6.87 per cent ash, 41.45 per cent total cellulose (of which 69.04 per cent alpha, 14.64 per cent beta and 16.32 per cent gamma), 22.11 per cent pentose, 23.38 per cent total soluble carbohydrates, 1.76 per cent ether extract, and 1.55 per cent benzene-alcohol extract. The carbohydrate resembles a hemicellulose, and on hydrolysis yields arabinose. Digestion of the fiber with 8 per cent aqueous sodium hydroxide for 6 hrs. at 160 deg. C. gives an easily bleachable grey, soft pulp.—A.P.-C.

Brazil's Way Toward Independence. A. Niklander. Wochbl Papierfabr. 69, Special Number: 52-56 (June 17-19, 1938). About two-thirds of the raw fibers used in the manufacture of paper are imported, there being only two pulp mills in Brazil, the reason being lack of capital and high cost of transportation. The history of several mills are given; the research into raw materials available is discussed with a table showing the fiber lengths and possibilities for using these raw materials.—J.F.O.

Paper Specialties

Raw Paper for Litmus Paper. Wochbl. Papierfabr. 69, no. 11:241; no. 15:327 (March 12, April 9, 1938); B. I. P. C. 8:438.—A mill supplied for a number of years absorptive blotting paper (pure cotton rag paper) for conversion into litmus paper. The last delivery was rejected because the red and neutral papers lost their absorptivity after about 2-3 months, whereas the blue paper was not thus affected. The red litmus solution is acidified with sulfuric acid and after impregnating and drying, slight traces of the acid remain in the paper. Other raw papers which contained in part chemical wood pulp did not lose their absorptivity when treated in the identical manner. Some answers suggest that the traces of sulfuric acid have a slight parchmentizing action upon the paper, causing it to lose its absorptivity, and that the paper maker is not to blame. The use of hydrochloric in the place of sulfuric acid is suggested for acidifying the litmus solution. This does not account for the behavior of the neutral paper, for which a chemical analysis is required; the plant water is suggested as one possible reason. Another answer points out that the natural waxes, protoplasma residues, etc., in the cotton fiber may cause a subsequent sizing effect and decrease the absorptivity of the fiber. These constituents are not present in the chemically treated wood fiber and, since strength is not a requisite for this kind of paper, the use of pulps from deciduous trees is suggested.—C.J.W.

Suitability of Coated and Raw Cardboard for the Drawing Process. F. Diller. Kartonnagen u. Papierwaren-Ztg. 42, no. 22:233-234, 236 (June 3, 1938); B. I. P. C. 8:415.—This process is applied to a number of uses, especially to the manufacture of cigarette boxes. A sheet of cardboard of accurate size is automatically placed upon a heated stationary die, while a second movable die is pressed against it. After lifting the upper die, the shaped box is automatically removed. Not every cardboard is equally suitable for this process. In the present article the following important factors and their optimum values under different conditions are discussed: *a)* temperature of dies, *b)* moisture content of cardboard, probably the most significant variable in the process, *c)* pressure applied, and *d)* whether raw or coated cardboard is used.—C.J.W.

Manufacture of Tissue Paper Product. A. F. Burgess assignee of International Cellucotton Products Co. Brit, pat. 473,300 (April 9, 1936).—Creped towel paper is passed through a calender where the creping is partly crushed and stretched. The paper is then embossed. Suitable machinery is claimed.—A.P.-C.

Window Containers. Kartonnagen- u. Papierwaren-Ztg. 42, no. 26:281-2 (July 1, 1938); B. I. P. C. 8:498.—Directions are given for obtaining satisfactory results with pasted window containers, which are very liable to warp or distort. The correct choice of the transparent foil and carton is very important. The foil should be cut with the narrow side in the machine direction; long and narrow windows cause more distortions than square or oval ones. Tensions after drying are more noticeable in lighter than in heavier boards. The adhesive should contain as little water as possible; both foil and carton should not be perfectly dry when the adhesive is applied.—C.J.W.

Future Prospects for Kraft and Jute. A. G. Goldsmith. Fibre Containers 23, no. 7:14,16 (July, 1938).—The term jute board is a misnomer, since jute is no longer used in its manufacture; it consists of about 25 per cent kraft pulp and 75 per cent old paper stock and is manufactured on a multi-cylinder machine. A filled kraft cylinder sheet consists also of a blend of kraft pulp and old paper; the percentage of kraft, however, is greater than used in an ordinary jute board. A Fourdrinier kraft liner has a cost advantage; jute liner, on the other hand, excels in printing surface. Jute has a certain place in the container field and will continue to furnish a proportion of the liner made, although the bulk of the material will be supplied by kraft liner. In the corrugating field the advantage of kraft over straw and chestnut is not as noticeable as it is in liner. The quality of strawboard has increased immeasurably during the last ten years. Chestnut, pinewood, and gumwood are other low cost products able to compete with kraft on account of their lower price.—C.J.W.

Paper Milk Bottle. E. Wheaton, R. H. Lueck and F. W. Tanner. J. Milk Tech. 1, no. 3:11-15 (1938); C. A. 32:5208.—Paperboard from which paper milk containers are made comes from pure virgin pulp. This pulp is subjected to treatment with calcium acid sulphite or alkaline sodium sulphate at high temperature, bleached with chlorine and then passed to the rolls of the papermaking machine. These processes operate to yield a paperboard of low bacterial content. The paraffining of the paper further reduces the bacterial count.—C.J.W.

Sanitary Aspects of Paper Milk Containers. M. J. Prucha. J. Milk Tech. 1, no. 2:4-9 (1938); O. A. 32:5208.—Methods of making paper to be used for manufacturing paper milk bottles are described. When sulphite-process bleached pulp is used for the paper, the paper bottles are practically sterile. When the containers are paraffined they also become practically sterile. It makes no difference as far as sterility was concerned, whether the paraffining was done at 170°, 180° or 190° F. However, if the containers become contaminated before paraffining, paraffining cannot be depended on to produce sterile containers in all cases.—C.J.W.

Surface Treatment of Paper or Cardboard. I. G. Farbenindustrie—A.G. French pat. 822,953, (Jan. 11, 1938).—Paper or cardboard is treated with an aqueous solution of a water-soluble cellulose ether or an aqueous alkaline solution of a water-insoluble cellulose ether. Suitable water-soluble ethers are cellulose glycol ethers and the ethers obtainable by the reaction of alkali cellulose with ethylene chlorosulphonic acid or with monochloroacetic acid. Suitable water-insoluble but alkali-soluble ethers are the water-insoluble methylcelluloses. The solutions may contain also a loading agent, such as kaolin or lithopone. Starch also may be included. When alkaline solutions are used, the paper or cardboards may be after-treated with an acidic reagent, such as a solution of aluminum sulphate or steam containing an acid vapor. The products are useful for writing and printing purposes.—A.P.-C.

Adhesive Coated Paper Cloth and the Like. Creed & Co., Ltd., assignees of H. R. Dalton. Brit. pat. 482,225, (April 22, 1936).—Adhesive coatings on paper, etc., are prevented from becoming sticky on exposure to a damp atmosphere by coating with a protective layer containing a salt of an aliphatic amine, e.g., diethylene diamine, morpholine, etc., and a higher saturated or unsaturated fatty acid; oils, fats, waxes, and organic plastics, e.g., rubber, may also be present to reduce the slippery nature of the

protective film. E.g., a suitable emulsion for application to the adhesive surface is prepared from 10 parts of medicinal paraffin, 7.3 parts of oleic acid, 2.8 parts of triethanolamine, and 250 parts of water. —A.P.-C.

Manufacture of Paper Bottles. Wilhelm Lange. Kartonnagen- u. Papierwaren-Ztg. 42, no. 19:202-204 (May 13, 1938); B. I. P. C. 8:439.—Different methods are described for making paper bottles for various liquids, milk in particular, and their closures. —C.J.W.

Water-Resistant, Impregnated Creped Paper. Fr. Obitz. Papier-Ztg. 63, no. 37:762 (May 7, 1938); B. I. P. C. 8:440.—A new impregnating method for fine and coarse creped paper is described, in which the pre-heated creped web is led between a heated paraffining cylinder and a soft cloth (rubber, felt, or other elastic material) to which the impregnating medium is also applied. The installation can either be connected following the creping cylinder or be used as an entirely separate unit.—C.J.W.

Paper as Substitute for Other Raw Materials. Papier-Ztg. 63, no. 41:829-830 (May 21, 1938); B. I. P. C. 8:431.—The article brings examples of molded pulp articles which previously were made from other raw materials, such as different types of containers, tropical hats, music records, etc. Waste paper and rosin or rosin-wax sizes are the most commonly used materials, the rosin-wax emulsions especially where a high water-resistance is required. In the case of records, greater care must be exercised in the choice of the materials, because type and beating degree of fibers, as well as the size, have a special influence on sound reproduction, and not all materials are suitable. The articles are molded under pressure and heat. Exceedingly high resistance to impact and fracture and high elasticity values can be obtained in such molded paper products, especially when combined with certain synthetic resins.—C.J.W.

Wood Pulp Boards. Ankarsviks Angsags Aktiebolag and Frans I. E. Stenfors. Brit. pat. 477,214 (Dec. 23, 1937).—In a strong board for heat or sound insulation, made of wood pulp and having no predominating fiber direction, alternate sheets are hard and of specific gravity 1 to 1.8 and porous and of specific gravity 0.2 to 0.3. The wire markings of the hard sheets aid in bonding with the porous sheets, a warm or cold glue press and casein or animal glue, etc., being used. The hard sheets may be impregnated with paraffin, linseed oil, etc.—A.P.-C.

Sodium Silicate Adhesive Bonds in Corrugated Fiberboard. O. E. Schupp, Jr., and E. B. Roller. Ind. Eng. Chem. 30:603-611 (June, 1938.—A method of photographing the sodium silicate adhesive in corrugated fiberboard has been developed and applied to over 100 specimens of board made from both commercial and experimental silicate adhesives under varied plant operating conditions, and representing a wide variety of bond structures. Penetrations of silicate into paper is slight and seldom of importance. In commercial boards, single-face bonds are inherently unsymmetrical, with a large shoulder on one side, a very small shoulder or no shoulder at all on the other, and an extremely thin silicate layer in the direct or paper-to-paper bond. They vary little in size and structure from bond to bond. The lack of symmetry in the joint is a function of machine design and is characteristic of all boards examined. Board and box strengths are related to bond structure. Bonds reinforced by adequate shoulders give boards of good strength. Reinforcement of liner and corrugated medium by a thin layer of adhesive extending beyond the shoulders may appreciably increase the compression strength of boxes.—A.P.-C.

Chemical Investigations on Building Boards. F. Kollmann and Gertraud Just. Holz als Roh- u. Werkstoff 1, no. 9:339-342 (June, 1938); B. I. P. C. 8:461.—According to new German specifications building board produced from wood wool with a setting material, such as magnesite mortar, Portland cement, or gypsum, should not contain any constituents with a harmful reaction upon other construction materials with which they are liable to come into contact, iron and concrete in particular. Testing methods for this purpose were therefore required for dry and wet conditions; the present article contains suggestions for tests, with special reference to the detection of free sulfates and chlorides.—C.J.W.

The Lining of Boards. Kartonnagen- u. Papierweren-Ztg. 42, no. 26:280-1 (July 1, 1938); B. I. P. C. 8:459.—Binder's board is usually covered with paper; durable pasting depends on a suitable surface of the paper and board to be glued together or subsequent splitting will result, particularly when the articles are subjected to frequent bending. The board surface should be somewhat rough and not too absorptive, so that the adhesive penetrates to a certain extent only. The paper should not be too smooth and hard. The consistency of the adhesive must be adapted to the absorptiveness of the surfaces, i.e., a thicker paste should be chosen for very absorptive board. In the case of very hard and smooth surfaces it will help to moisten them with water before the application of the adhesive. If a hard sized paper with a tendency for curling on the side to which no paste is applied must be used, it should be moistened on the outer side, so that a uniform stretching of both sides takes place after the adhesive is brushed on the inner side. The pasted paper should slide on to the board from one edge to avoid the inclusion of air bubbles. The adhesive should be applied every uniformly over the entire surface to avoid uneven tensions. Every board lined on one side only has a tendency to bend, which will be the more pronounced, the more the paper stretched on moistening. Perfectly flat boards can only be obtained when lined on both sides with papers whose tension has an equalizing effect.—C.J.W.

Miscellaneous

Air Conditioning in the Carton Plant. Robert J. Flanagan. Am. Box Bakers 28, no. 10:11-12, 30-31 (June, 1938); B. I. P. C. 8:414.—A description of the air conditioning plant installed in the Chicago Carton Company and the advantages derived from this installation.—C.J.W.

Air Conditioning for Set-up Box Plants. Am. Box Makers 28, no. 11:22-23 (July, 1938); B. I. P. C. 8:458.—The greatest part of set-up box manufacturing centers around the staying and gluing operations; air conditioning will speed up these procedures, as well as the printing, wrapping, and stripping, and eliminate static electricity.—C.J.W.

Repair and Preservation of Records in the National Archives. Arthur E. Kimberly. Chemist 15, no. 3:236-244 (May, 1938); B. I. P. C. 8:433.—The equipment and procedures used in the Division of Repair and Preservation of the National Archives is described, including fumigation, cleaning, flattening, repairing, and control of storage conditions. The ideal preservation process is one in which the docu-

ments are sealed permanently against the harmful gases of the atmosphere without the use of any adhesive. This can be achieved by placing the document between sheets of cellulose acetate foil and applying heat and pressure in a hydraulic press. The degree of heat and pressure varies with the type of paper under treatment. Documents so covered are relatively impervious to gases and, if necessary, may be cleaned with soap and water.—C.J.W.

The Durability of Books. Gunther Reichardt. Papier-Fabr. 36, no. 7:85-89 (Feb. 11, 1938).—The important factors effecting the durability of paper are; the chemical influence of the atmosphere, organisms and unusual conditions. The moisture in the atmosphere and also its varying, the effect of oxygen, sulphur dioxide, and sun light shorten the life of paper. The damage done by microorganisms is extensively described with the aid of many references to the literature.—J.F.O.

Researches Carried Out at the Norwegian Institute of Technology, Lab. D. 1937. S. Schmidt-Nielsen. Papir-J. 26, no. 7:83-85; no. 8:94-97; no. 9:109-112; no. 10:127-128, 130-131; no. 11:136-139 (April 20, 30, May 20, 31, June 20, 1938); B. I. P. C. 8:497.—The author reports the results of various researches carried out in Trondjem, Norway, under his supervision. (1) The influence of various *p*H values on the chlorine consumption in a two-step bleaching process for sulphate pulp was studied; best results were obtained by bleaching with chlorine gas at low *p*H in the first step, followed by an alkaline wash and a hypochlorite bleach at a *p*H of about 9-10; poorest results were obtained by bleaching in an alkaline medium in both steps. (2) The relationship between the reduced viscosity of a pulp and aging was established, using Ekenstam's phosphoric acid method for the viscosity determinations (Ber. 69:549-52 [1936]). Pulp samples received from different mills were stored at different temperatures and for various periods; the higher the temperature and the longer the storage period, the greater the drop in viscosity. This decrease is an indication of reduced molecular weight, a breaking-down of longer cellulose chains into smaller units. Copper number determinations on these pulps showed correspondingly increased values. (3) Brief reference is made to the weakening of cotton yarn by light and to experiments for establishing the influence of certain dyestuffs upon the degradation of the cellulose fiber exposed to light. Of the colors tested, Eosin caused the greatest increase in copper number. (4) Studies on filler retention with micronized talcum are described. The influence of rate of dewatering, consistency and temperature in paper of identical basis weight and with the same amount of filler addition was first established; other factors studied were variations in amount of filler added, different basis weights, the percentage of long and short fibers, beating degree, particle size, the addition of chemicals, and the *p*H. The results are discussed and illustrated by graphs.—C.J.W.

Static Electricity in Paper. Wochbl. Papierfabr. 69, no. 13:280; no. 18:387; no. 19:411 (March 26, April 30, May 7, 1938); B. I. P. C. 8:450—The manufacturer of printing paper containing mechanical pulp receives complaints from his customers on account of static electricity in the paper and seeks remedies. Reference is made to different de-electrifying devices and methods of installation; attention is also drawn to the large literature existing on this subject. The paper should be cooled to room temperature while still on the paper machine; in the case of thicker papers, this cooling must be thorough and not simply on the surface. This requires large cooling cylinders, their number varying with the size of the machine.—C.J.W.

Rhythm in Paper Requirements and Production, as Well as the Function of the Paper Jobber. H. Salzer. Z. Papier, Pappe, Zellulose u. Holzstoff 56, no. 9:124-129 (May 15, 1938); B. I. P. C. 8:435.—The author refers to seasonal fluctuations in the demand for paper, the present trend of consumers being to keep as little stock as possible on hand and to order the supply needed on short notice whenever orders are received. The paper jobber functions as the natural clearing house between the usually distant paper mill and the centers as consumption; the mill can produce economically only in large quantities, whereas the retail trade buys in small lots. Here again, the jobber has to act as the equalizing factor. Special reference is made to the advantages of standardization; according to one authority 866 different paper sizes are sold throughout the world. There is nowadays also a decided trend amongst jobbers to specialize in one field, such as printing papers or wrapping papers, etc. The warehouse of such a specialized jobber can of course be far more efficient. The difficult task of the jobber is to anticipate demand by having sufficient stock on hand without tying up too much capital which could be used to better advantage elsewhere.—C.J.W.

The Japanese Paper Market. Z. Papier, Pappe, Zellulose u. Holzstoff 56, no. 10:140-2 (May 31, 1938. Statistical figures with regard to production, imports, and exports for 1936 and 1937 are given.—C.J.W.

The Pulp Industry of the United States. H. Anstrin, Svensk Papherstidn. 41, no. 9:293-8 (May 15, 1938); B. I. P. C. 8:434.—A review of the pulp industry of the United States is given with separate figures for the sulphite, sulphate, and groundwood pulp indstries. Special reference is made to economic factors such as tariffs, labor, cost of production, etc.—C.J.W.

The Building Up of the Paper Industry in Hungary. L. Bauer. Z. Papier, Pappe, Zellulose, Holzstoff 56, no. 10:137-40 (May 31, 1938); B. I. P. C. 8:434.—A review is given of the paper industry of Hungary before the war, the building up of a new industry, its capacity, imports, technical equipment, and domestic consumption.—C.J.W.

Southern Mills a Threat to Wisconsin. C. F. Butcher. Fibre Containers 23, no. 6:16, 20, 22 (June, 1938). [Reprinted from Milwaukee Journal of May 15, 1938]; B. I. P. C. 8:435.—Paper and paperboard manufacturing in Wisconsin is compared with the Southern development. Constructive management of the Wisconsin forests should enable the state to hold its own in output of specialty production, even if it cannot hope to compete successfully with the South in bulk production of sulphate pulp.—C.J.W.

The German Pulp Industry of the Present Time and in the Future. A. Foulon. Papen- u. Holzstoff-Ztg. 45 no. 19:210-1 (May 13, 1938); B. I. P. C. 8:435.—The possibilities are reviewed for meeting the continuously increasing demands of the German pulp, paper, board, rayon, staple fiber, and plastics industries by careful selection of the most suitable raw materials and economic re-use of wastes, as well as by the development of raw materials hitherto not employed.—C.J.W.

Study of the Physical Characteristics of Sulphite Pitch*

By Robert O. Ragan[1] and Otto Kress[2]

Abstract

The presence of soft, plastic pitch in pulp is, without question, the cause of the difficulty that may be experienced from so-called pitch trouble when this type of pulp is converted into paper on the paper machine. The normal methods of evaluating a pulp to determine potential pitch troubles are unsatisfactory, and a procedure has now been developed which will differentiate between pulp carrying pitch that does not offer trouble and pulp carrying pitch that may offer trouble. Although considerable additional data must be collected by each mill that might be interested in employing this method, a procedure has been developed which will clearly indicate the relative amount of pitch trouble that may be encountered from different types of pulp.

The importance of pitch troubles to the pulp and paper industry is evidenced by the voluminous literature on this subject. Most of the investigations which have been made, however, have dealt with the chemical analysis of pitch and with attempts to attribute the cause of the trouble to the presence of certain constituents of the pitch. At present, however, no decision has been reached as to which of the constituents is the troublesome component. As a result, no one method of testing pulps for pitch trouble has been accepted as being wholly reliable by the pulp and paper industry. This condition is due probably to the failure to recognize the importance of the physical properties of the pitch as it exists in the pulp. Undoubtedly, the physical nature of pitch in pulps which give considerable trouble on the paper machine is different from that in pulps which give only minor difficulties.

It has previously been observed by Kress and Moss *(1)* that a suspension of rosin in pulp stock did not give typical pitch deposits on conversion of the pulp into paper until the temperature of the suspension approached the melting point of the rosin. Presumably, the only change in the system caused by the increase in temperature was the softening of the suspended rosin particles. This experiment alone would indicate that the tackiness, or softness, of the pitch has a direct bearing upon the readiness with which pitchy deposits collect upon the papermaking equipment. Further evidence that the tackiness of pitch is related to the severity of pitch troubles is the fact that well-seasoned wood rarely, if ever, yields a pulp which gives severe pitch trouble. The pitch in green wood is soft, tacky, and quite fluid, whereas that in seasoned wood is much harder, more brittle, and has lost most of its tackiness through chemical changes which occur during storage.

The purpose of this investigation, therefore, was to find a method whereby the pitch could be isolated from a sample of pulp without changing its physical nature, that is, a procedure by which the pitch could be collected in its original form from pulp without also effecting a change in the plasticity or tackiness of the pitch. Then, by suitable tests on the samples which had been isolated from a large number of pulps whose troublesome or trouble-free behavior in actual paper mill operation was known, it was hoped that a decided difference would be found in some of the properties of the pitch obtained from the two types of pulp.

Such a distinguishing characteristic was found to exist in the plastic property of the pitch; that from troublesome pulps was found to be very fluid, whereas that from satisfactory pulps was harder and much less mobile.

Experimental Work

The experimental investigation was divided into three parts. First, the selection or construction of an apparatus suitable for measuring the so-called "tackiness" of pitch. Second, the perfection of a technique for isolating the pitch by employing known reference materials which were at the opposite extremes of the range of tackiness, namely, raw spruce pitch and papermaker's rosin. Third, the application of these techniques to an investigation of the pitch found in commercial sulphite pulps.

The Testing Apparatus

There are several physical tests which might be used to determine the distinctive characteristics of various types of sulphite pitch. However, a consideration of the quantity of material required and of the difficulties to be encountered eliminated tests based on melting point, cohesion, surface tension, and other physical properties.

Any test developed should permit a numerical evaluation of the so-called tackiness of the pitch samples. The meaning of the term "tackiness" cannot well be defined mathematically, because this term is not used to designate any one fundamental property of pitch. The tackiness of pitch is an expression generally used to define the sticky, gummy feel of the pitch to the fingers. It implies a combination of plasticity, adhesion, cohesion, and other factors. It was decided that the plasticity of pitch would be the property most easily determined, as well as the most revealing, and that a measure for it should be devised. Plasticity, which is the rate of irreversible deformation of a material when subjected to stress, was measured by means of the apparatus described below.

The principle of the apparatus was the determination of the length of time required for a small ball to pull free under a definite stress from a sample of pitch

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[1] Present address, Nekoosa-Edwards Paper Company, Port Edwards, Wis.

[2] Member TAPPI, Technical Director, The Institute of Paper Chemistry, Appleton, Wis.

in which it was partly imbedded. Of the various types tested, the following was found to be the most sensitive and also the most satisfactory (illustrated in Fig. 1).

A receptacle *(B)* for holding the pitch was made by drilling a ⅜-inch hold in a small square piece of 15-gage brass sheet. This piece was then soldered flat onto a slightly larger piece of metal cut from a tin can. All the solder was carefully scraped out of the cavity thus formed. A half-gallon tin can completely filled with water served both as a support for the pitch-filled receptacle and as a means for keeping the pitch at a constant temperature. The receptacle was held firmly in contact with the top surface of the can by metal slips soldered onto the can. Suspended about 4 inches directly above the receptacle was a ⅜-inch detempered ball bearing *(A)* attached to a string by means of a small bolt threaded into the ball. The string led over a frictionless pulley, to the other end of which was tied a small weight pan *(E)* which just counterbalanced the weight of the ball plus the friction in the pulley *(F)*.

The procedure for making a test was as follows: The receptacle was filled level full with pitch by introducing an excess of the latter into the hole with a steel spatula and leveling off the surface with a knife edge. In this manner, a constant volume of pitch was used for each test. The filled receptacle was then placed in position on the can, which was completely filled with water at the proper temperature of 20 deg. C.; the level in the can was controlled by introducing the water under pressure and maintaining a slight overflow. (Slight changes in temperature were found to have a profound effect upon the plasticity of the pitch.) The pan was loaded with a 3-gram weight, and the ball was pressed into the pitch and gently moved about to insure uniform contact on all sides; the ball was left carefully centered in the cavity and pressed firmly against the bottom. A stop-watch was used to measure the time required for the ball to pull completely free from the pitch.

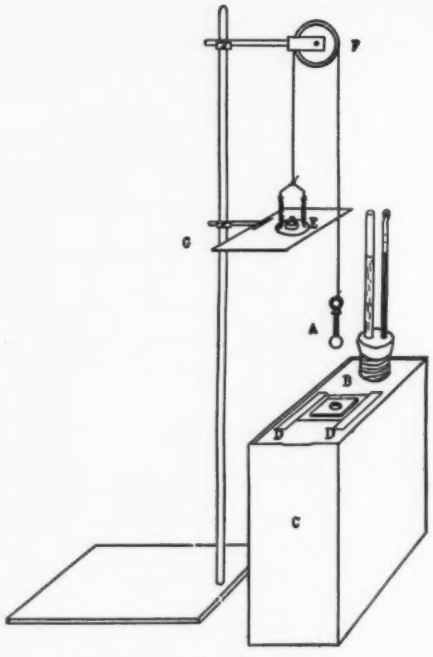

FIG. 1
Improved Apparatus For Testing Pitch.

That the plasticity of the pitch was the property being measured was shown by the straight line trends obtained on plotting the experimental data as stress versus reciprocal of time. It can be shown mathematically that the relationship between these two quantities should be linear.

Although the apparatus could have been calibrated with a material of known plasticity to determine the factor for converting the readings to absolute plasticities, it was decided for the sake of simplicity to adopt an arbitrary stress of 3 grams and a temperature of 20 deg. C. as constants. The time required for the ball to pull loose from the pitch thus served as a measure of the relative plasticities of the samples; the shorter the time, the softer and more fluid was the pitch.

METHOD FOR ISOLATING THE PITCH

Preliminary experiments showed that the solvents normally used in quantitative pitch determinations, namely, ether, petroleum ether, alcohol, and alcohol-benzene, could not be used in this investigation, as no way was found to remove the solvent from the pitch residue without drastically affecting the plasticity of the latter.

The raw pitch used in these experiments was obtained from the ends of green spruce logs that had been in storage about three months. This pitch was colorless, contained about 3 per cent insoluble material (mostly dirt), and was sufficiently fluid to flow slightly at room temperature.

Solutions of this raw pitch and of F-grade rosin in the previously mentioned solvents were concentrated by air evaporation, oven heating, and evaporation under reduced pressure, with and without heat. In no case, however, did the plasticity of the pitch isolated from the solution even closely approach the plasticity value of 8 seconds observed for the raw, undissolved pitch. Attempted removal of the last traces of solvent by prolonged exposure of the pitch residue to the air was particularly unreliable because of the film of hardened, oxidized pitch which formed on the surface. Oven heating was equally deleterious. A sample of raw pitch heated for an hour at 105 deg. C. became as brittle as rosin. This hardening was no doubt due to oxidation and polymerization and to the loss of volatile constituents present in the raw pitch. Evaporation of the solvent under reduced pressure was the most promising procedure, but here again the results were not reproducible because of the uncontrollable variations in the rate of evaporation with each test.

Ethyl acetate proved to be a satisfactory solvent for isolating the pitch. The procedure used for isolating the pitch is as follows: The ethyl acetate solution containing the pitch was concentrated to 50 to 100 cc. by distillation, the solvent being recovered. The concentrated residue was filtered through cotton into a 100-cc. beaker and placed directly in front of an electric fan to hasten evaporation. The pitch was stirred occasionally during the evaporation, which was continued until the residue was of such consistency that it would just flow when the beaker was tilted. The beaker was then filled half full with water at 50 deg. C. and the pitch stirred and smeared around the sides of the beaker for 5 minutes. To harden the pitch, which at this stage was quite fluid, 50 cc. of cold water was added and stirred into the pitch for 5 minutes. The water was then poured off

and the beaker containing the pitch was refilled with fresh water at 45 deg. C. After working in the warm water for 5 more minutes, a final kneading with cold water was sufficient to harden even the most fluid pitch so that the small globules could be collected into one mass. The pitch was left covered with water unless it was to be tested immediately. Before testing, the droplets of water which adhered to the surface of the pitch were removed as far as possible by shaking the beaker.

In the analysis of pulps and green wood to be described later, it was found necessary to remove the water from the recovered solvent before employing it in another extraction. In distilling off the ethyl acetate, the portion which boiled at 74.5 deg. to 76.5 deg. C. was collected separately and reused without drying. The portion which distilled below 74.5 deg. C. was dried over anhydrous sodium carbonate and then fractionally distilled.

It was found that 50 deg. C. was the most satisfactory temperature at which to wash the pitch with water. The temperature of washing, the amount of stirring, and the duration of contact with the water seemed to have a slight effect upon the pitch; the warmer the wash water, the more the pitch was softened. Higher temperatures made the general run of pitch so fluid that it would not collect on the side of the beaker so that the water could be poured off, and washing with water at lower temperatures caused some samples to become so viscous that there was danger of incomplete washing.

Raw, undissolved pitch, when subjected to the above water-wash treatment, remained practically unchanged. Its viscosity value was only a few seconds higher.

The reliability of this technique for isolating the pitch was tested in the following ways.

A large sample of raw pitch was exposed to the hardening action of the air, and the plasticity was tested at regular intervals. At each time of testing, a sample of the oxidized pitch was also dissolved in ethyl acetate and concentrated by the procedure given above. The values for the plasticity of the pitch increased steadily from an initial reading of 8 seconds for the raw pitch to 5.7 minutes for the pitch which had been exposed to the air for 20 hours. The values for the samples of the oxidized pitch which had been dissolved in ethyl acetate and subjected to the standard isolation procedure before testing followed exactly the same trend as the untreated pitch. This experiment showed that the decrease in plasticity of the pitch as it becomes hardened by contact with the air can be followed by means of the ethyl acetate-water wash procedure.

Two filter papers were impregnated with a solution of raw pitch dissolved in ethyl acetate. One of the papers was immediately stoppered in a test tube and protected from heat and light, and the other impregnated paper was hung over a radiator for 24 hours. At the end of this time, both samples were extracted with ethyl acetate and the pitch isolated. The pitch from the protected filter paper was unchanged, whereas that from the paper which had been exposed to the air was found to have a plasticity of over 15 minutes.

In order to determine the effect of seasoning of wood on the plasticity of the pitch which it contained, sawdust from green and from seasoned spruce logs was extracted with ethyl acetate, and the pitch isolated as usual.

Pitch from seasoned wood	34 seconds
Pitch from air-dried, green wood	27 seconds

The unexpected small difference in these values was no doubt due to the fact that the pitch in the green wood sawdust had become hardened while the sample was air-drying. In order to investigate this possibility, a sample of the wet, green wood sawdust was dried overnight in a calcium chloride vacuum desiccator. This experiment indicates that the seasoning of green wood causes the pitch to become much harder.

Pitch from desiccated, green wood sawdust	6 seconds

It was interesting to note that, as would be expected, the pitch isolated from the wood in no way resembled that which was obtained from the ends of the logs. The pitch from both the seasoned and the green sawdust had an oily feel and little, if any, tackiness; it was quite yellow in color, and very mobile.

Investigation of Commercial Sulphite Pulps

Several pulp and paper mills which were experiencing pitch difficulties submitted samples of their pulps which were known to give pitch trouble, together with samples of pulps which were being run without serious difficulty. These samples ranged from very dry, unbleached, pressed pulp board to highly bleached, slush pulp. All the samples were subjected to the same routine procedure for isolating the pitch.

About 150 grams (200 grams, if wet pulp) of each pulp sample were torn into small pieces, covered with ethyl acetate, and gently refluxed for 2 hours. The solution was then poured off, and the pitch isolated in the previously described manner.

Quantitative determinations showed that refluxing for 2 hours was sufficient to remove all but insignificant traces of the pitch, and that the total ether-soluble and alcohol-soluble portions of the pitch were removed by the ethyl acetate.

It was also found to be unnecessary to air-dry the samples of wet pulps before refluxing if as much of the water as possible was first squeezed out of the pulp by hand.

The pitch isolated from the troublesome pulps was very similar in appearance and feel to that previously isolated from spruce wood sawdust.

The results of the tests on these pulps are given below. The tests were made at a temperature of 20 deg. C., and the stress was 3 grams.

ANALYSIS OF COMMERCIAL PULPS

Mill	Kind and Form of Pulp	Mill Behavior of Pulp with Respect to Pitch Trouble	Time Required by the Pitch in the Testing Apparatus
1	Unbleached, Dry Board	Bad	2 sec.
	Unbleached, Dry Board	Good	Over 30 min.
2	Bleached, Wet Laps	Bad	1 min., 20 sec.
	Bleached, Wet Crumbs	Good	2 min.
*3	Bleached, Wet Crumbs	Good	Over 30 min.
4	Unbleached, Dry Board	Worst pulp	1.7 sec.
	Unbleached, Dry Board	Very bad	2 sec.
	Unbleached, Dry Board	Bad	8 sec.
	Unbleached, Dry Board	Good	4 min.
*5	Unbleached, Dry Board	Bad	8 sec.
6	Unbleached, Wet Laps	Bad	8 sec.
	Unbleached, Dry Board	Good	Over 30 min.
7	Bleached, Dry Board	Worst pulp	3.5 sec.
	Bleached, Dry Board	Next worst	13 sec.
	Unbleached, Dry Board	Troublesome	10 sec.
	Bleached, Dry Board	Next best	5 min.
	Unbleached, Dry Board	Good	Over 30 min.

* This mill submitted only one sample.

Literature Cited

1. Kress, O., and Moss, L. A., *Paper Trade J.* 102, no. 25: 38-49 (June 18, 1936). A fairly complete bibliography is appended to this article.

Thermoplastic Coatings—A New Approach To Decorative Paper*

By J. H. Long[1]

Abstract

The development of heat-stable coating compositions and a precision type of coating equipment has led to a new method of producing coated paper. The nature of the coating compositions is discussed. The properties of the coated paper which is of the high gloss decorative type are described.

The rapidly expanding use of lacquer as a protective and decorative coating for paper has stimulated the imagination of the lacquer chemist, with the result that new materials and new methods are being investigated in the development of products suitable for the field of modern packaging.

To those unfamiliar with the lacquering of paper, it may be pointed out that the coating composition consists of a film-forming agent compounded with one or more film-modifying ingredients dispersed in a suitable volatile solvent. The function of the solvent is to reduce the viscosity of the lacquer solids so that they can be flowed out as a continuous surface film on the paper by the coating equipment. Since the solvent is eventually removed from the film during the drying operation, it is obvious that it functions primarily as a means to a desired end. Lacquer solvents are expensive, and, therefore, the larger converting mills reduce production costs by operating solvent recovery systems. However, those familiar with lacquer have speculated and worked on methods whereby the coated paper can be produced either by using a lesser quantity of costly solvent or by completely dispensing with it. Lacquer emulsions, in which water is the major volatile component of the coating mix, illustrates a typical example of one method which permits not only the use of a higher solids content but also a reduction of solvent costs. However, the present paper deals with some of the problems encountered in completely dispensing with the use of volatile solvent as an ingredient of the coating mix.

Temperature Limitations

It will be recognized that if volatile solvent is not used in the lacquer formulation, then some other means must be found for reducing the viscosity of the solids so that they can be applied to the paper as a continuous coating. High temperature is such a means; however, there exists a temperature limit above which it would be impractical to operate because of the well-known effect which heat has on the strength of the paper. This temperature limit was taken as 165 deg. C. Furthermore, temperatures in excess of 165 deg. C. would undoubtedly introduce difficulties in the construction and operation of coating equipment which must of necessity be of the precision type.

The idea of applying a molten composition to paper at elevated temperatures and of having the coating solidify at room temperatures implies that at the upper temperature limit there is also a viscosity limit above which it would be impractical to apply the molten coating. In order to make this viscosity limit as high as possible, the coating equipment should be of a type which uses a combination of both heat and pressure to flow out the molten coating as a continuous surface film on the paper. The machine which was finally developed by its manufacturer and which has been used in this development was found capable of satisfactorily coating compositions at 165 deg. C., having a viscosity of 1-2 sec. (Saybolt-Furol at 165 deg. C.).

Temperature and viscosity limitations having been established, the first work consisted in taking the solids of typical paper lacquer formulations, fusing the ingredients together, and observing what effect temperature up to 165 deg. C. had on the viscosity and heat stability of the melt. These results as a whole were very disappointing because heat-instability and uncoatable viscosities were encountered in one formula after another. It therefore became necessary to open a broad and general program of investigation on film-forming and film-modifying agents as ingredients for suitable coating compositions.

Cellulose derivatives have long been used in the protective coatings industry as film-forming agents because they are unexcelled in combining the very desirable property of flexibility with those of hardness and freedom from tackiness. The most widely used cellulose derivatives in surface coatings are cellulose nitrate, cellulose acetate, and ethyl cellulose. In coating compositions applied by a solvent, each of these film-forming agents has its distinct place, depending on the particular requirements which the coating must pass. But in considering the suitability of these derivatives for use in compositions to be applied to paper by thermoplastic means ethyl cellulose has advantages over cellulose acetate and cellulose nitrate; it has better heat stability at elevated temperature than cellulose nitrate and has compatibility with a greater number of film-modifying agents than cellulose acetate. Furthermore, the initial flexibility, the initial color, the color stability, make ethyl cellulose a logical choice as a film-forming ingredient in thermoplastic coating compositions.

Ethyl cellulose, alone, cannot be applied to paper at 165 deg. C. since it begins to soften at 110 deg. C. but does not melt until a temperature of 200 deg. C. is reached. It is therefore necessary that its viscosity be reduced, and this, of course, can be done by utilizing film-modifying resins and plasticizers as non-volatile solvents.

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[1] PMC Division—Synthetics Dept., Hercules Powder Company, Wilmington, Del.

Suitable Resins

The number of resins which are suitable for thermoplastic application to paper either alone or with other ingredients is limited because of the requirement of heat stability. Natural resins tend to break down under the action of heat, with the result that the non-volatile components of the resin increase in hardness and darkness as heating is continued. On the other hand, many synthetic resins are not subject to degradation by heat but a large class of them undergo a rapid polymerization when held at elevated temperatures, and this polymerization is accompanied by an increase in viscosity until eventually the resin becomes insoluble and infusible; thus, the requirement of heat stability, when coupled with requirements that the resin have compatibility with the film-forming agent, greatly restricts the field of selection. It is also obvious that the resin should be as tack-free and as flexible as possible. As a matter of fact, most resins are either tack-free and brittle or they are flexible and tacky.

Certain of the Petrex resins, as well as pure hydrocarbon resins, meet the above requirements and, as would be expected, were found to impart a highly desirable gloss and hardness to the film of coating solids.

Although films of ethyl cellulose alone have excellent flexibility even at very low temperatures, resin-ethyl cellulose films generally require plasticizing agents and this is especially true if the resin is of the high-melting tack-free type. There are a large number of heat-stable plasticizers which are compatible with resin-ethyl cellulose mixtures and for the purpose of comparison they can be divided into two main classes: one class acts as good non-volatile solvents for the resin and ethyl cellulose yielding solutions of relatively low viscosity at elevated temperature, while the second class of plasticizers are poor solvents and yield ethyl cellulose-resin mixtures of relatively high viscosity at elevated temperature. Specific examples of the solvent type plasticizers are dibutyl phthalate, tricresyl phosphate and diphenyl phthalate, while the poor solvent type plasticizers are substances such as the vegetable oils.

Limits on the maximum concentration of ethyl cellulose in specific formulations of resin and plasticizer can be established roughly by measurements on viscosity of the fused ingredients at the maximum application temperature of 165 deg. C. Limits on the concentration of plasticizer and resin for a maximum ethyl cellulose content also can be established roughly by observing the tackiness and brittleness of films from the three non-volatile components cast from volatile solvents. The indicated useful formulations then can be more thoroughly tested by coating them thermoplastically on paper and evaluating the properties of the coated stock.

Paper Applications

A plasticized glassine stock was selected first as the base for overcoating with the hot melt compositions because of its dense and smooth surface; although uniformly smoth coatings of one pound per ream (24 x 36 inches—500) could be obtained, the temperature of application caused some loss of plasticizer from the glassine base with resultant non-reproducible results insofar as the tackiness of the surface coating was concerned. A casein-clay coated stock of the type used for lacquering was finally chosen for the coating experiments, and with this type of paper minimum coating weights of 3 pounds per ream could be obtained.

After conditioning the coated paper (70 deg. F., 65 per cent relative humidity for 24 hours), tests were carried out on specimens having coating weights ranging from as low as 3 pounds per ream to as high as 10 pounds per ream, and insofar as possible attempts were made to correlate properties of the coated paper with the weight of applied coating. Prior to further evaluation, all weighed specimens of coated paper were examined for gloss, resistance to blocking, scuff resistance, and flexibility.

If the coated paper was judged worthwhile testing further, then such properties as ultra-violet light discoloration, heat discoloration, moisture-vapor proofness, grease resistance, etc., were studied.

Gloss determinations were made, using the Ingersol glarimeter. Instrument readings were taken on the uncoated paper, the coated paper, and plate glass over the uncoated paper. The uncoated paper was assumed to have a gloss value of 0 per cent, while uncoated paper covered with the plate glass was assumed to have a gloss value of 100 per cent; hence, the per cent gloss of the coated paper could be calculated. On this basis, hot melt coated paper was found to have a gloss value of 70 per cent which is somewhat higher than lacquer and close to that of cellophane laminated paper.

In measuring resistance to blocking, six specimens (2 x 2 inches), with the coated side facing uncoated side, were stacked on a clean glass plate, and a smooth (1 x 1 inch) piece of metal was centered on the top sheet. A load of 1 pound per square inch was then applied to the stack of paper which were maintained at 120 deg. F. for two hours in an air-heated oven. At the end of the 2-hour period, the papers were examined for evidence of blocking which was classified as satisfactory only if the original gloss of the coating was undiminished. Of course, some formulations led to actual sticking of coated sheet to uncoated sheet, in which case resistance to blocking was obviously unsatisfactory.

Scuff resistance was evaluated by measuring the difference in gloss value of the coated paper before and after scuffing. The scuffing was effected by placing a 4 x 4 inch piece of 100-mesh copper wire, carrying a 3000 gram load, on the coated test area which was then subjected to 50 strokes of the scuffing surface. Although this method of testing is only semi-quantitative, it permitted a distinction to be made between high-grade lacquer coatings, hot melt coatings, and spirit varnish coatings. Hot melt coatings have a scuff resistance close to that of lacquer and definitely superior to spirit varnish.

The flexibility of the surface coating, or rather its ability to withstand creasing without breaking, was semi-quantitatively tested. The method of test consisted of placing a 4 x 4 inch sheet of coated paper over a wire of known diameter, with the uncoated surface of the paper in contact with the wire. The free ends of the sheet were secured with a paper clamp to which was attached a 50-gram weight. The smallest diameter wire which caused a break of the surface film, as indicated by oil penetration tests, was found to be 2 mm. for the hot melt coated paper. Spirit varnish coatings of comparable thickness on the same type of paper broke when placed over 6-millimeter wire, while lacquer films broke over 0.5 mm. wire.

Hot melt coated papers which are of the extremely high-gloss, non-blocking, and scuff-resistant type are

not moisture-vapor resistant enough to be classified as moisture-vaporproof. Very low transmission constants are obtained when the tests are run over uncreased areas, but due to insufficient flexibility, the film of coating is permeable to water vapor transmission at the heavily creased areas.

Although thermoplastic application of compositions of the type described above is an interesting approach to the problem of producing coated papers, sound conclusions cannot be drawn at this time on the value of the product in the field of decorative and protective papers. Acceptance of this new type of coated paper for a particular use does not necessarily mean that it will be found suitable for other specific uses. Most certainly, flexibility of the coating will have to be improved to meet the rigid protective requirements in certain branches of the packaging field; likewise, inks for over-printing the coated paper are being developed, although the present coating compositions introduce no problem when applied over paper printed with either oil- or aniline-type inks. Suitable adhesives for sealing the coated paper when it is handled in packaging machinery are also receiving attention and this does not appear to be an insurmountable problem. The future importance, then, of coating with thermoplastic compositions must rest on the further investigation of those requirements, both technical and economic, which must be satisfied for specific cases in the broad and general field of decorative and protective papers.

The Use of Costs in Mill Operation*

By J. F. Hagenauer[1]

Abstract

A brief comment advocating the beneficial results of informing mill foremen about operating costs and the advantage to be obtained from a study of mill costs.

Periodically in most mills an accounting summary is drawn, giving in more or less detail, an analysis of past operating performance. In the majority of cases, however, this statement is drawn more or less from an accounting and financial viewpoint. To the director, the treasurer, the controller it unquestionably furnishes a good deal of information which they, due to their training and experience, can interpret and be guided thereby.

The statements, however, also contain valuable information which should be passed along to the superintendent and technical men in the mill. These people, whose major training has been along operating lines are frequently unable to properly interpret and use the figures in their existing form. It is therefore highly advisable to prepare simple statements containing only information of interest to and controllable by the operating men. If it can be done, it is preferable to prepare such a statement for each production unit such as the pulp mill, paper mill, boiler house and other departments requiring detailed study. Particularly valuable, for instance, is an analysis of maintenance and repair costs.

Recently, I had the opportunity to apply this method of procedure in a two-machine mill. Early in my contact with the mill, I discovered that the superintendent had little, if any, coherent information as to costs. The foreman in charge of the various production units, none whatsoever.

As a first step towards overcoming this handicap, the superintendent was supplied each period with a copy of the cost analysis showing the variance over and under the standard cost established. Through personal contact, he was encouraged to familiarize himself with the various cost items and to apply his operating knowledge to the various costs subject to his control and to obtain economies and reductions in the cost of mill operation. A few weeks later, a still more simplified analysis of operating costs was submitted for the first time at a newly instituted foremen's meeting and discussed item by item. The cost of the various operating items for the past year, for the year to date and for the period just closed was shown to the men.

The reaction of the foremen to this innovation was astounding. After a few meetings, the question was put before them as to whether or not they wished this discussion discontinued and if they felt that they were obtaining benefit from such meetings, which would assist them in a better performance of their duties. Each plainly stated that he wished to continue these discussions, since he realized now where and how savings could be made and how important even a reduction of few cents would be to the earning possibilities of the company. Several of the men stated that heretofore they were under the impression that the mill was making money as long as it was running.

It would involve too lengthy a discussion to point out all the savings which were realized. Sufficient for the purpose is to state that within four or five months the cost of coal, per ton of paper produced, was reduced approximately 22 per cent, the cost of wires and clothing about 21.5 per cent and a considerable reduction was realized in the cost of maintenance and repairs. These actual dollar and cents savings in various cost items were supplemented by increased speed of the machines.

The interest of the men was aroused to such an extent that they voluntarily came to these meetings with definite suggestion as to improvement in furnish, machinery and manufacturing processes. Through the cooperation of all men vitally interested in the welfare of the mill, it was possible to improve furnishes, thereby providing an additional saving of between $2.50 and $3.00 per ton of finished paper.

Let me return for a few minutes to the maintenance and repair department. Discussions with the superintendent and the master mechanic revealed that in the past certain socalled improvements had been made in the mill. It was necessary to discontinue the use

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Roosevelt Hotel, New York, N. Y., Feb. 20-23, 1939.

[1] Member TAPPI, Consultant, Elkton, Md.

of some of the equipment that had been installed. Being a consultant, I drew out of this, one lesson, which I would like to pass on to you technical men, namely, never suggest, without thorough investigation, the installation of any piece of equipment which you may have seen in operation in any other mill, without being thoroughly familiar with the methods employed and machinery used in the mill by which you are engaged. Please do not misunderstand me, I am not saying that the equipment was not the best for its purpose, but it was not needed or necessary to obtain the results desired in this particular mill.

My close connection with the active operation of this particular mill has confirmed my previous opinion that the various cost files in the mills contain valuable information which can be used to obtain more economic operation of equipment and to produce a better product at lower cost.

The information found in the cost files, however, is not only applicable to the operation of the mill but it also provides a basis for study and analysis of the merchandising problems of the company. It is evident that the paper industry is lagging behind other industries in the application of sales analyses and sound merchandising principles. This is borne out by a study of paper prices made covering the past few years. The results of such studies will reveal that paper prices have fallen off in many lines in the face of existing low inventories; steadily increasing costs and a slow but steadily increasing demand for the product. They will also show that many mills, without sufficient justification, are selling their products beyond the limits of their economic sphere. In many grades the prices realized by the mills will not yield a profit to mills with average operating costs. The outstanding and profitable mills, today, are those which have applied the principles of sales analysis and merchandising to their particular line with success.

The question might be raised why I have brought this discussion before you technical men. If you recall, I have spoken to you before in more detail on labor costs; production costs; losses in production and kindred subjects. I spoke to you again today because I feel that you, as technical men, are unquestionably the parties who should take the leadership along these lines. Through your training in colleges and laboratories, you have been taught that definite, lasting results can only be obtained through consistent effort and clear and definite analysis of any problem presenting itself. If you begin to use the information contained in your cost files and preach their use to those with whom you are in daily contact, it will start the ball rolling towards the goal toward which we are all striving, that of operating our mills profitably and successfully.

Adhesives For Corrugating*

By J. V. Bauer[1]

Abstract

Comments are made regarding the value of using the Olsen compression test for measuring the strength of corrugated containers. Emphasis is given to the need of testing under standard humidity conditions and use humidity conditions. The fallacy of using excessive amounts of adhesive to impart strength to containers is cited. New starch adhesives are mentioned.

During the last four years considerable development has taken place in the corrugated industry with regard to corrugating adhesives. Within this period the new starch adhesives have been successfully introduced and several improvements in the older types of adhesives have been made. Along with these new developments in corrugating adhesives there is a definite trend in the corrugating industry toward making a better and stronger corrugated box.

One of the characteristics of the newer types of corrugating adhesives is that they give a higher degree of bond between corrugation and the liner than was formerly possible. This improved bonding effect is particularly of value when highly sized papers or treated papers such as asphalt treated papers are to be combined.

It is our opinion that the improved bonding effect of the newer corrugating adhesives offers the corrugated box industry and the paper industry their greatest opportunity to improve the strength of corrugated paper boxes. It should be understood that we do not feel that the mere improvement in bond between the corrugation and the liners, will in itself very greatly improve the strength of a corrugated box. Although the strength of bond between the corrugation and the liners is an important factor in producing a satisfactory box, the strength of a finished box is fundamentally determined by paper materials used and the care applied in the manufacture of the box.

The real value of the increased bonding effect of the newer types of corrugating adhesives lies in the fact that they can be used to bond more highly sized or treated papers than was formerly practical. Because of this feature they make possible the use of stiffer and more moisture resistant paper materials which retain to a greater extent their stiffness and strength under high humidity conditions.

From the standpoint of the paper manufacturer we believe that improvements in corrugating mediums offer the best opportunity of increasing the strength and rigidity of corrugated board and boxes. Most of the present day corrugating media are of hygroscopic non-sized type which are readily softened by moisture. They have been purposely given these characteristics in order that they may be readily plasticized by steam showers and formed into uniform corrugations at high rates of speed. From the standpoint of the finished box however, the hygroscopic nature of the corrugated paper core is a definite drawback. A box that is strong and rigid under low humidity conditions rapidly loses its rigidity when subjected to high humidity conditions. The best remedy for this inherent weakness of corrugated board would be the development of sized or specially treated corrugating media which are less susceptible to moisture but which still can be readily corrugated. An

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Roosevelt Hotel, New York, N. Y., Feb. 20-23, 1939.

[1] Stein-Hall Manufacturing Company, New York, N. Y.

example of a development of this nature is the recently introduced asphalt treated corrugating media. Today's improved corrugating adhesives and improvements in corrugating machine design make the practical use of sized or treated corrugating media much less of a problem than they were formerly and therefore favor the introduction of further developments along this line.

Olsen Compression Test

Along with the increasing trend among box manufacturers to produce better boxes the Olsen compression test as a means of measuring the strength of the finished box has come rapidly to the fore. The various testing laboratories specializing in this test have accumulated sufficient data so that given samples of the paper materials from which the box was manufactured they can within certain limits predict the strength the box should show under the Olsen compression test if it were perfectly fabricated. The Olsen compression test is therefore of great value to the corrugated box manufacturer as a check on the degree of perfection that was attained in manufacturing the boxes submitted to the test.

Secondary in importance to checking the degree of perfection attained in fabricating the box the Olsen test is of value in comparing the relative merits of the paper materials from which the box is manufactured. The results of the Olsen test when used in this way must be very carefully interpreted because of the very great extent to which imperfections in fabrication of the box affects the strength. The relative merits of different paper materials can be safely compared only when run on the same corrugating machine and subjected to identical scoring, printing, slotting and taping conditions.

Effect of Excessive Use of Adhesives

There has been considerable discussion in the corrugating industry as to the value of using an excess of adhesive as a means of increasing the compression strength of boxes. The theory of such practice being that by applying an excess of adhesive a bead of adhesive is formed along either side of the flute and acts as a reinforcement. It is our opinion that the value of such a practice is very doubtful. Although it is true that in some cases the use of an excess amount of adhesive gives a slight increase in compression strength the disadvantages of using such excessive amounts of adhesive more than offset this gain. In the first place the use of excessive amounts of adhesive nearly always results in a higher percentage of scrap. In the second place the adhesive costs using an excess spread of adhesive are at least 2 to 5 cents higher per 1000 sq. ft. of double faced board, than a normal spread of adhesive. The use of an excess spread of adhesive for the purpose of increasing box strength is, for the extra costs involved, very inefficient and furthermore very uncertain. The corrugated box manufacturer who wants to increase the strength of his boxes can accomplish much more in this direction by using a normal spread of adhesive and spending one to three dollars more per ton of corrugating medium.

We have mentioned above that the Olsen compression test is of great value as a check on the materials and workmanship used in the fabrication of a corrugated box. The Olsen test can also be of value as an indication of how that box wil stand up under actual conditions of use. The Olsen test alone, however, should not be considered as the only criterion as to the suitability of a box under actual use conditions. A box in use must not only be rigid, but it must be sufficiently tough and resilient to withstand sudden shock loads such as might be imposed by its being dropped or jolted during shipment. Furthermore, the boxes should be capable of withstanding for long periods the high humidity conditions quite often encountered in damp warehouses, refrigerator cars, boats, etc.

It is our opinion that the Olsen test to be of real value for gauging the excellence of a box as a shipping container should not only be made under the ideally controlled humidity conditions of the laboratory, but also should be made after the boxes have been submitted to unfavorably high humidity conditions for a considerable period. The value of a box as a shipping container should not be determined by the way the box shows up under ideal conditions, but rather should be gauged by the manner it performs under the less favorable conditions it is likely to encounter in actual use. The strength of a box is only as good as the strength it exhibits at the highest humidity conditions to which it may be exposed in use.

We believe there has been a tendency to overemphasize the value of strength tests made under ideal conditions without keeping the conditions of actual usage in mind. High strength tests on a box under ideal humidity conditions are meaningless unless it can be shown that the box also retains a major proportion of its strength under high humidity conditions.

If real progress in improving the strength of corrugated boxes is to be made, it must be made along lines of overcoming the inherent weakness of corrugated shipping containers, namely, their loss of strength under high humidity conditions.

We believe the development of improved corrugating media with this factor in mind offers a real opportunity for the paper manufacturer. Among other adhesive developments in the field of corrugated board have been the introduction of special acid reacting starch adhesives for the purpose of making corrugated board having a definitely pH suitable for the packing of plate glass. It is well known that highly alkaline adhesives, due to their detrimental effect on polished glass surfaces, have not been satisfactory for this purpose. This adhesive development is, in itself, of considerable value to the corrugated paper board industry in that it enables manufacturers to produce a board that will meet the specifications of plate glass manufacturers, and thereby extends the use of corrugated board to fields for which it was formerly not suitable.

Another improvement in adhesives that is of interest to the box manufacturer is the new types of sealing and box tapes that are being gummed with a recently developed starch gum adhesive, instead of with the animal and fish glue adhesives commonly used for this purpose.

These new types of gummed tape not only have superior qualities in regard to excellence of adhesion and the rapidity with which they set up to form a bond, but they also have among additional features a complete lack of any disagreeable odor. This odorless characteristic is of particular value to the box maker who makes containers for food packaging, or other purposes wherein any trace of foreign odor about the container is highly undesirable.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING JULY 8, 1939

SUMMARY

Cigarette paper .....334 cs.
Wall paper .....7 cs.
Newsprint .....13,718 rolls
Printing paper .....48 rolls 83 cs.
Wrapping paper .....72 bls., 108 rolls, 6 cs.
Drawing paper .....6 rolls, 30 cs.
Filter paper .....9 cs.
Surface baryta coated paper .....117 cs.
Surface coated paper .....1 bbl. 230 cs.
Photo paper .....4 cs.
Basic paper .....15 cs.
Decalcomania paper .....15 cs. (Simplex) 15 cs.
Tissue paper .....27 pkgs., 5 cs.
Cardboard .....37 cs.
Paper tubes .....83 cs.
Miscellaneous paper .....15 bls., 113 cs.

CIGARETTE PAPER

De Manduit Paper Corp., *Ile de France,* Havre, 1 cs.
Champagne Paper Corp., *Ile de France,* Havre, 333 cs.

WALL PAPER

F. Blank & Co., *Washington,* Havre, 7 cs.

NEWSPRINT

H. G. Craig & Co., *Donpaco,* Donnacona, 318 rolls.
Parsons & Whittemore, Inc., *Sophocles,* Sundsvall, 203 rolls.
Street & Smith Publications, *California,* Glasgow, 158 rolls.
H. G. Craig & Co., *Newscarrier,* Donnacona, 230 rolls.
N. Y. Evening Journal, *Markland,* Liverpool, N. S., 570 rolls.
N. Y. Tribune, *Markland,* Liverpool, N. S., 1512 rolls.
World Telegram, *Markland,* Liverpool, N. S., 584 rolls.
Brooklyn Daily Eagle, *Markland,* Liverpool, N. S., 541 rolls.
Herald Statesman, Inc., *Markland,* Liverpool, N. S., 42 rolls.
International Paper Co., *G.T.D.,* Gatineau, 323 rolls.
News Syndicate Co., Inc., *Brand,* Comeau Bay, 7444 rolls.
———, *Stravangerfjord,* Oslo, 288 rolls.
Lunham & Reeve, Inc., *Scanpenn,* Kotka, 321 rolls.
Jay Madden Corp., *Scanpenn,* Kotka, 323 rolls.
Jay Madden Corp., *Washington,* Finland, 334 rolls.
Jay Madden Corp., *Hansa,* Finland, 527 rolls.

PRINTING PAPER

N. Y. Worlds Fair, *Mercier,* Antwerp, 3 cs.
Dingelstedt & Co., *Europa,* Bremen, 48 rolls, 43 cs.
E. Dietzgen & Co., *Hansa,* Hamburg, 37 cs.

WRAPPING PAPER

Globe Shipping Co., *Black Tern,* Antwerp, 1 cs.
Superior Paper Co., *Mormacsea,* Rauma, 72 bls.
———, *Mormacsea,* Rauma, 108 rolls.
Japan Paper Co., *Mercier,* Antwerp, 5 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., *American Farmer,* London, 13 cs.
Stevens Nelson Paper Corp., *American Farmer,* London, 1 cs.
Winsor & Newton, Inc., *American Farmer,* London, 3 cs.
Keuffel & Esser Co., *Washington,* Hamburg, 6 rolls, 13 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., *American Farmer,* London, 9 cs.

SURFACE BARYTA COATED PAPER

Dingelstedt & Co., *Pennland,* Antwerp, 104 cs.
Atlantic F'd'g. Co., *Washington,* Hamburg, 13 cs.

SURFACE COATED PAPER

Gevaert Co., of America, *Pennland,* Antwerp, 216 cs.
C. Happel, *Washington,* Hamburg, 14 cs.
Lansen Naeve Corp., *Hansa,* Hamburg, 1 ble.

PHOTO PAPER

Heemsoth Kerner Corp., *Hansa,* Hamburg, 4 cs.

BASIC PAPER

Dingelstedt & Co., *Pennland,* Antwerp, 12 cs.
Globe Shipping Co., *Europa,* Bremen, 3 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Laconia,* Liverpool, (simplex) 15 cs.

DECALCOMANIAS

General Motors Overseas Operations, *Europa,* Bremen, 15 cs.

TISSUE PAPER

Jay Madden Corp., *Scanpenn,* Kotka, 27 pkgs.
Atlantic F'd'g. Co., *Hansa,* Hamburg, 5 cs.

CARDBOARD

F. C. Strype, *Zaandam,* Rotterdam, 37 cs.

PAPER TUBES

———, *Hansa,* Hamburg, 83 cs.

PAPER

Japan Paper Co., *Azumasan* Maru, Kobe, 13 cs.
———, *Kirsshima Maru,* Kobe, 40 cs.
Steiner Paper Corp., *Pennland,* Antwerp, 25 cs.
F. J. Markwalter & Co., *Pennland,* Antwerp, 22 cs.
Roger & Gallet, *Ile de France,* Havre, 1 cs.
———, *Ile de France,* Havre, 4 cs. 10 bls.
American Express Co., *Ile de France,* Havre, 5 bls.
Coty Processing Co., *Ile de France,* Havre, 1 cs.
Lunham & Reeve, Inc., *Ile de France,* Havre, 2 cs.
———, *Tancred,* Hong Kong, 5 cs.

RAGS, BAGGINGS, ETC.

Manufacturers Trust Co., *Collamer,* Dunkirk, 21 bls. rags.
———, *Laconia,* Liverpool, 67 bls. bagging.
Manufacturers Trust Co., *Laconia,* Liverpool, 35 bls. rags, 11 bls. threadwaste.
———, *Laconia,* Liverpool, 25 bls. rags.
Manufacturers Trust Co., *Pr. Harrison,* Bombay, 100 bls. cotton waste.
Loumar Textile By Products, *Black Tern,* Antwerp, 135 bls. bagging.
Fein & Co., *Black Tern,* Antwerp, 45 bls. rags.
W. Steck & Co., *Exeter,* Alexandria, 454 bls. rags.
Irving Trust Co., *Exeter,* Alexandria, 62 bls. bagging.
Darmstadt Scott & Courtney, *Scanpenn,* Copenhagen, 64 bls. bagging, 20 bls. bag scrap.
G. W. Millar & Co., Inc., *Cold Harbor,* Dundee, 163 bls. paper stock.
Continental Bank Trust Co., *Mercier,* Antwerp, 75 bls. flax-waste.

OLD ROPE

———, *Exeter,* Marseilles, 61 rolls.

CASEIN

Swift & Co., *Northern Prince,* Buenos Ayres, 406 bags.

WOOD PULP

Bulkley Dunton Pulp Co., Inc., *Sophocles,* ———, 550 bls. sulphite, 10 tons; 625 bls. sulphate, 125 tons; 750 bls. kraft sulphate, 125 tons.
Cellulose Sales Corp., *Sophocles,* Soderhamn, 275 bls. sulphite, 55 tons.

———, *Sophocles,* Obbola, 3500 bls. dry sulphate, 500 tons.
J. Andersen & Co., *Sophocles,* Sundsvall, 2400 bls. sulphate, 400 tons.
Cellulose Sales Corp., *Sophocles,* Sundsvall, 2550 bls. dry sulphite, 505 tons; 150 bls. kraft sulphate, 25 tons.
Mead Sales Co. Inc., *Sophocles,* Sundsvall, 500 bls. dry sulphite, 100 tons.
Bank of N. Y. Trust Co., *Sophocles,* Hernosand, 1230 bls. mechanical pulp.
———, *Sophocles,* Hernosand, 5610 bls. dry sulphate, 2750 bls. wet sulphite.
The Borregaard Co., Inc., *Stavangerfjord,* Oslo, 300 bls. wood pulp.
Chase National Bank, *Stavangerfjord,* Oslo, 450 bls. wood pulp.
Pulp Sales Corp., *Scanpenn,* Helsingfors, 130 bls. mechanically ground pulp.
Pulp Sales Corp., *Scanpenn,* Wilborg, 500 bls. sulphate, 100 tons; 508 bls. mechanically ground pulp, 100 tons; 3416 bls. sulphite, 671 tons.
Pulp Sales Corp., *Mormacsea,* Kemi, 165 bls. sulphite, 27 tons; 3800 bls. sulphate, 634 tons.
Pulp Sales Corp., *Mormacsea,* Varjakka, 1560 bls. sulphate, 310 tons.
Chase National Bank, *Mercier,* Antwerp, 94 bls. wood pulp.
Price & Pierce, Ltd., *Bockenheim,* ———, 150 bls. unbleached sulphite.

WOOD PULP BOARDS

Jay Madden Corp., *Scanpenn,* Wiborg, 2 rolls.
Jay Madden Corp., *Scanpenn,* Kotka, 68 rolls, 67 bls.

NEWARK IMPORTS

WEEK ENDING JULY 8, 1939

Pulp Sales Corp., *Ragnbildsholm,* Viipuei, 5109 bls. sulphite.
Pulp Sales Corp., *Ragnhildsholm,* Kotka, 300 bls. sulphite.
H. G. Craig & Co., *Donpaco,* Donnacona, 227 rolls newsprint.

ALBANY IMPORTS

WEEK ENDING JULY 8, 1939

Cellulose Sales Corp., *Sophocles,* Sundsvall, 5204 bls. dry sulphite, 995 tons; 150 bls. kraft sulphate, 25 tons.
Perkins Goodwin & Co., *Sophocles,* Sundsvall, 2670 bls. kraft sulphate 452 tons.
Bank of N. Y. Trust Co., *Sophocles,* Hernosand, 3480 bls. dry sulphite.
———, *Sophocles,* Hernosand, 330 dry sulphate, 600 bls. dry sulphite.
Perkins Goodwin & Co., *Sophocles,* Soderhamn, 825 dry sulphate, 165 tons.
Cellulose Sales Corp., *Sophocles,* Soderhamn, 275 bls. sulphite, 55 tons.
Bulkley Dunton Pulp Co., Inc., *Sophocles,* ———, 250 bls. dry sulphite, 50 tons.
———, *Mormacsea,* Stockholm, 600 bls. sulphite, 100 tons.
Bulkley Dunton Pulp Co., Inc., *Mormacsea,* ———, 600 bls. sulphite, 100 tons.
Pulp Sales Corp., *Mormacsea,* Rauma, 2552 bls. sulphite, 422 tons.
Pulp Sales Corp., *Mormacsea,* Kemi, 1584 bls. sulphate, 264 tons.
Pulp Sales Corp., *Mormacsea,* Varjakka, 3895 bls. sulphate, 779 tons.
Price & Pierce, Ltd., *Bockenheim,* ———, 2400 bls. unbleached sulphite; 250 bls. unbleached mechanical pulp; 1380 bls. unbleached sulphate.

BOSTON IMPORTS

WEEK ENDING JULY 8, 1939

Elliott Addressing Machine Co., *Tancred,* Yokohama, 11 cs. paper.
———, *Collamer,* Dunkirk, 33 bls. rags.
———, *Pr. Harrison,* Bombay, 385 bags pickers.

PHILADELPHIA IMPORTS

WEEK ENDING JULY 8, 1939

Castle & Overton, Inc., *Collamer,* Havre, 53 bls. rags.
F. Weber & Co., *Black Tern,* Antwerp, 3 cs. drawing paper.
Castle & Overton, Inc., *Black Tern,* Rotterdam, 131 bls. rags.
J. W. Hampton Jr., & Co., *Scanpenn,* Kotka, 110 rolls newsprint.
Jay Madden Corp., *Scanpenn,* Kotka, 103 rolls woodpulp.
F. Whitaker & Co., *Scanpenn,* Copenhagen, 15 bls. rags.

BALTIMORE IMPORTS

WEEK ENDING JULY 8, 1939

Congoleum Nairn Co., *Collamer,* Havre, 407 bls. rags.
American Express Co., *Black Osprey,* Antwerp, 4 cs. stencil paper.
Bulkley Dunton Pulp Co., Inc., *Scanpenn,* ———, 710 bls. sulphite, 289 tons.
Pulp Sales Corp., *Scanpenn,* Wiborg, 1325 bls. sulphite, 265 tons.
Pulp Sales Corp., *Scanpenn,* Kotka, 2132 bls. mechanically ground pulp, 426 tons.
Jay Madden Corp., Scanpenn, Kotka, 71 rolls newsprint.

NEWPORT NEWS IMPORTS

WEEK ENDING JULY 8, 1939

De Manduit Paper Corp., *Collamer,* Havre, 957 cs. cigarette paper.
Bulkley Dunton Pulp Co., Inc., *Sophocles,* ———, 840 bls. kraft sulphate, 140 tons; 1950 bls. dry sulphate, 390 tons.
Cellulose Sales Corp., *Sophocles,* Sundsvall, 990 bls. kraft sulphate, 165 tons.
Cellulose Sales Corp., *Sophocles,* Soderhamn, 575 bls. dry sulphate, 111 tons.

NORFOLK IMPORTS

WEEK ENDING JULY 8, 1939

Champagne Paper Corp., *Collamer,* Havre, 400 cs. cigarette paper.
Loumar Textile By Products, *Black Osprey,* Antwerp, 127 bls. bagging.
Mead Sales Co., Inc., *Sophocles,* Sundsvall, 10195 bls. dry sulphite, 1800 tons.

MONTREAL IMPORTS

WEEK ENDING JULY 8, 1939

Gottesman & Co., Inc., *Blankaholm,* Sweden, 3625 bls. wood pulp.
Gottesman & Co., Inc., *Hulda Thorden,* Sweden, 8200 bls. wood pulp.
Gottesman & Co., Inc., *Idefjord,* Sweden, 12000 bls. wood pulp.
Price & Pierce, Ltd., *Blankaholm,* ———, 3750 bls. unbleached kraft pulp.

Adirondack Builds at Glens Falls

The American Industrial Company, 220 Delaware avenue, Buffalo, N. Y., has licensed the Adirondack Pulp and Paper Corporation of Glens Falls, N. Y., just being organized, to produce high grade bleached kraft, bleached sulphite, and ground wood by the Oxford and McGregor processes.

The new corporation is headed up by well-known Glens Falls men. A tract of land has been purchased near the Imperial Wall Paper Color Company, with ample spring water to take care of their processing needs.

The first thirty ton unit will be in operation in about sixty days, the product of which will be sold locally.

The machinery has been ordered from the American Paper Machinery and Engineering Works, and ground was broken for the new plant on July 10.

A. Abrams Speaks at Cambridge

CAMBRIDGE, Mass., July 10, 1939—A. Abrams, of the Marathon Paper Mills Company, Ashland, Wis., and a former president of the Technical Association of the Pulp and Paper Industry, was on the program of the Food Technology Conference recently held at the Massachusetts Institute of Technology as leader in a round table discussion of Packaging Equipment and Processes.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, July 12, 1939.

Wholesale volume in the paper market declined seasonally over the Independence Day holiday, as was expected. Reports from many manufacturers' representatives, jobbers, and general paper merchants indicate continued firmness of the market under a good demand and with good prospects for the future.

The volume of general business at the first of the current month was approximately 10 per cent above the same period last year. The areas of greatest activity indicated in reports, were in the South Atlantic and North Mountain States. Business in the New York area was reported as better than the national average. The nation's business as indicated in industrial payrolls, is about 85 per cent of the 1923-25 average, and approximately 14 per cent higher than last year. The average weekly wage in industry, according to the National Industrial Conference Board, was above $26.00, compared with $29.75 in 1937, and with $22.98 in 1938. The average factory wage is now 50 per cent above the low of 1932.

The index of general business activity for the week ended July 1, declined to 90.8 per cent, from 91.3 per cent for the previous week, compared with 76.4 per cent for the corresponding week in 1938. The estimated normal of 100 per cent, was reached in the last quarter of 1937 and in the second quarter of 1930.

The production ratio of 134 paper mills for the week ended July 1 was 76.4 per cent, compared with 78.1 per cent for the preceding week, with 67.5 per cent for the corresponding week in 1938, and with 85.2 per cent in 1937. Paper board production for the week ended July 1 was 70.0 per cent, compared with 66.0 per cent for the preceding week, with 62.0 per cent for the corresponding period in 1938, and with 76.0 per cent in 1937.

Wholesale trade in all grades of paper declined under the influence of the holiday, with sales volume holding up well, considering the short business week. Demand for almost all grades of paper continues to be reported at a much higher level than at this period last year, increases of from 10 to 15 per cent being reported on various grades of sulphite and groundwood papers.

Production and shipments of kraft paper has seasonally declined, which is a normal condition at this period of the year. Consumption continues at a relatively high level and volume is being well maintained for the season. Prices on all grades of paper continue firm and unchanged.

Mechanical Pulp

The demand for mechanical pulp continues at about the same moderately good level, with the market reported as fairly firm. Prices remain unchanged at prevailing quotations.

Chemical Pulp

Consumption of many grades of chemical pulp continue to be reported as fairly good. A little more firmness is reported in the highest grades of unbleached sulphite pulps, while kraft and bleached sulphite pulps are weak. No important change in the prices of any standard grade of chemical pulp, domestic and imported, has been reported at this date.

Old Rope and Bagging

Trading in old rope continues in a very limited volume during the current week, with prices steady and unchanged. The old bagging market is quiet and prices are unchanged at this date.

Rags

Buying in the domestic rag market is reported as rather slow at this date, with No. 1 white shirt cutting showing the most activity. Prices on all grades of new and old domestic rags continue unchanged, with small advances in the better packs of No. 1 white shirt cuttings, which are currently quoted at from 6.90 to 7.00.

Old Waste Paper

Trading in the waste paper market declined to a low level during the Independence Day holiday. While news continues firm no important change in the price of any grade of waste paper has been reported at this date.

Twine

Holiday quiet prevailed in the twine market over the holiday. Prices remain relatively firm. No change from the prevailing market quotations in any grade of hard or soft fiber twine has been reported at this date. Trade prospects are considered good for the near future.

To Handle Heppenstall Knives

The Heppenstall Company of Pittsburgh, Pa., and Bridgeport, Conn., announces the appointment of Ray Smythe, 501 Park Building, Portland, Ore., as Pacific coast representative for its Eis and Kleenkut patented analysis special alloy knives for the pulp and paper industry.

Mr. Smythe has been closely identified with the paper industry for many years and for the past nine years has travelled the Coast section in the interest of his several lines.

The Heppenstall Company manufactures its own steel, and the processing of its several products is accomplished in its own plants. It has specialized for the past fifty years in the manufacture of shear knives for cutting metal, for which it has an enviable reputation.

A natural outgrowth of the shear knives has been these special knives for the pulp and paper industry, which have established exceptional performance records.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, July 12, 1939.

BLANC FIXE—Prices on blanc fixe continue firm and unchanged at prevailing market quotations. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Quotations on bleaching powder remain firm and conform to prevailing market prices. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as good for the current week, with prices firm and unchanged at this date. Standard domestic casein, 20-30, is currently quoted at 10 cents per pound; 80-100 mesh, at 10½ cents per pound; all prices in bags, car lot quantities.

CAUSTIC SODA—Prices on caustic soda continue firm and unchanged at prevailing market quotations. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay continue firm and remain unchanged at prevailing market levels. Domestic filler clay is quoted at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is offered at from $13 to $25 per ton, ship side.

CHLORINE—Prices on chlorine continue firm and conform to prevailing market quotations. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported as firm, with a good demand for some grades. "G" gum rosin is currently quoted at $4.85; "FF" wood rosin at $4.45, per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is offered at 2.70 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Prices on salt cake continue firm and are reported unchanged at prevailing market quotations. Prices range at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Quotations on soda ash continue firm and unchanged at prevailing market levels. Prices on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—The corn starch market continues firm under a good demand for the current week. Globe pearl is quoted at $2.55 per 100 pounds; special paper starch at $2.65 per 100 pounds. All prices in bags, car lot quantities, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are reported as firm and unchanged at prevailing market levels. The commercial grades are offered at $1.15; iron free at $1.30 per 100 pounds, in bags, car lot quantities, f. o. b., works.

SULPHUR—Prices on sulphur continue firm and are reported unchanged under a good demand. Annual contracts are quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Quotations on talc are reported as unchanged and to conform to prevailing market levels, with demand relatively good at this date. Domestic talc is currently offered at from $15 to $18 per ton, Eastern mines. Imported talc is quoted at from $20 to $40 per ton, on dock.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$4.75	@	$5.25
Superstandard	4.12½	@	4.62½
Northern Standard Wrapping	4.00	@	—
Standard Wrapping	3.50	@	—
Tissues—Per Ream—Carlots			
White No. 1	$0.82½	@	—
White No. 1 M. G.	.80	@	—
White No. 1½	.67½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.65	@	—
Colored	.77½	@	—
Kraft	.65	@	—
Manila	.60	@	—
Unbl. Toilet, 1 M.	2.65	@	—
Bleached Toilet	5.26	@	—
Paper Towels—Per Case			
Unbleached, Jr.	$1.75	@	—
Bleached Jr.	3.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	7.75	@	9.75
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	30.00	@	32.50
Chip	30.00	@	32.50
Sgl. Mla. Lt. Chip	42.50	@	—
Jute Lined Chip	42.50	@	45.00
White Pat. Coated	55.00	@	57.50
Kraft Liners	45.00	@	—
Binders Boards	71.00	@	77.00

The following are representative of distributers' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1.	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	@ 36.50	32.20	@ 37.75
85% Rag			29.90	@ 35.00
75% Rag	23.60	@ 27.75	24.75	@ 29.00
65% Rag			21.65	@ 26.25
50% Rag	17.55	@ 21.50	18.70	@ 22.75
25% Rag	14.65	@ 17.75	15.80	@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.60	@ $10.50	$9.75	@ $12.00
No. 2	7.70	@ 9.50	8.90	@ 10.75
No. 3	6.75	@ 8.25	7.90	@ 10.00
No. 4	7.00	@ 8.50	8.20	@ 10.00

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$11.30	@	$12.75
No. 2 Glossy Coated	9.70	@	11.00
No. 3 Glossy Coated	8.60	@	10.00
No. 4 Glossy Coated	6.05	@	9.25
No. 1 Antique (watermarked)	8.05	@	9.25
No. 2 Offset	7.45	@	8.50
A Grade E. F.	7.20	@	8.25
A Grade S. & S. C.	7.45	@	8.50
B Grade E. F.	6.65	@	7.75
B Grade S. & S. C.	6.90	@	8.00
C Grade E. F.	6.40	@	7.50
C Grade S. & S. C.	6.65	@	7.75
D Grade E. F.	6.10	@	7.00
D Grade S. & S. C.	6.35	@	7.25

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	22.50	@	24.00
Dry	22.50	@	24.00
(Delivered)			
No. 1 Domestic and Canadian	29.00	@	33.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.25	@	2.75
Prime Qualities—			
Easy-Bleaching Sulphite	1.90	@	2.00
Strong Unbleached Sulphite	1.70	@	1.90
(On Dock, Atlantic Ports)			
Kraft Bleached	2.50	@	2.75
Kraft Light & Strong	1.50	@	1.60
Kraft No. 1	1.40	@	1.50
Kraft No. 2	1.25	@	1.30
(F. o. b. Pulp Mill)			
Kraft Domestic	1.85	@	1.95
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.90	@	7.00
Silesias No. 1	4.50	@	4.75
New Unbleached	6.75	@	7.00
Blue Overall	4.90	@	5.00
Fancy	1.75	@	2.00
Washables	1.50	@	1.60
Mixed Khaki Cuttings	2.25	@	2.50
O. D. Khaki Cuttings	3.25	@	3.40

Old Rags

White, No. 1—			
Repacked	2.90	@	3.15
Miscellaneous	2.10	@	2.25
White, No. 2—			
Repacked	1.50	@	1.60
Miscellaneous	1.25	@	1.40
Thirds and Blues—			
Repacked	1.30	@	1.40
Miscellaneous	1.15	@	1.20
Roofing Rags—			
No. 1	.85	@	.95
No. 2	.67½	@	.77½
No. 3 (bagging)	.55	@	.65
No. 4	.60	@	.65
No. 5A	.60	@	.65

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—

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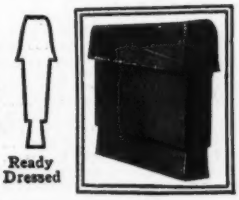

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No. 2 White Cotton.	3.25	@	3.75
No. 3 White Cotton.	2.50	@	3.00
No. 4 White Cotton.	1.90	@	2.20
Extra Light Prints..	2.00	@	2.40
Ord. Light Prints...	1.75	@	2.15
Med. Light Prints...	1.55	@	1.95
Dutch Blue Cottons.	2.25	@	2.50
French Blue Linens..	3.00	@	—
Checks and Blues...	2.00	@	—
Linsey Garments....	1.90	@	2.00
Dark Cottons.....	1.50	@	1.60
Old Shopperies.....	1.30	@	1.45
New Shopperies.....	1.45	@	1.50
French Blues.....	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.75	@	1.90
Domestic	1.75	@	1.80
Wool Tares, light...	1.60	@	1.70
Wool Tares, heavy..	1.80	@	1.90
Bright Bagging.....	1.60	@	1.70
Manila Rope—			
Foreign	2.60	@	2.75
Domestic	2.75	@	3.00
Jute Threads.....	3.00	@	3.25
Sisal Strings	1.50	@	1.60
Mixed Strings....	.55	@	.60

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.30	@	2.40
Ordinary Hard White No. 1....	1.90	@	2.00
Soft White No. 1..	1.60	@	1.75
Soft White Extra..	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag	.70	@	.75
Solid Flat Book...	.55	@	.60
Crumbled No. 1...	.40	@	.45
Ledger Stock White.	1.05	@	1.15
Ledger Stock Colored	.60	@	.70
New B. B. Chips....	.15	@	.20
Manila—			
New Env. Cut....	1.40	@	1.50
New Cuttings.....	1.00	@	1.20
Old Kraft Machine— Compressed bales..	.60	@	.65
News—			
No. 1 White News	1.25	@	1.30
Strictly Overissue.	.40	@	.45
Strictly Folded....	.27½	@	.32½
No. 1 Mixed Paper..	.17½	@	.22½

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.12¾	@	.14¼
White Hemp.....	.13¾	@	.15¾
Fine Polished—			
Fine India.....	.16	@	.18
Unpolished—			
Box	.09½	@	—
Paper Makers.....	.09½	@	.10½
Tube Rope.....	.10¼	@	.12½
Wall Paper.....	.10¼	@	.12½
Wrapping	.12	@	—
Soft Fiber Rope...	.12	@	.14
Cotton	.16	@	.19

(Hard Fiber)

Medium Java.....	.11	@	.17
Mex. Sisal.....	.10	@	.16
Manila	.16	@	.23
Domestic	2.65	@	2.75
Sisal Rope	1.75	@	1.85
Mixed Rope.....	.45	@	.50
Transmission Rope..	1.80	@	1.90
Soft Jute Rope	2.00	@	2.25
Jute Carpet Threads.	.75	@	.90
Gunny Bagging—			
Foreign	1.50	@	1.65
Domestic	1.40	@	1.50
Bleachery Burlap....	2.50	@	2.70
Gunny Bagging.....	1.45	@	1.60
Scrap Burlap—			
Foreign	1.35	@	1.40
Domestic	1.25	@	1.40
Scrap Sisal.....	1.55	@	1.60
Scrap Sisal for Shredding	1.75	@	1.80
Wool Tares, Heavy..	1.40	@	1.50
New Burlap Cuttings	2.00	@	2.25
Aust. Wool Pouches.	1.60	@	1.90
Heavy Baling Bagging	1.50	@	1.60
Paper Mill Bagging..	.85	@	1.00
No. 2 Bagging.....	.45	@	.50

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1....	.06⅞	@	.0690
New Light Flannelettes	.05	@	—
Silesias No. 1.....	.04	@	.04¼
New Black Silesias..	.03½	@	.03¾
Soft Unbleached.....	6.50	@	7.00
Blue Cheviots.....	.05	@	.05¼
Fancy	.02	@	.02½
Washable	.02	@	.02½
Cottons—According to grades—			
Blue Overalls.....	.04¼	@	.05
New Black, soft...	.03¾	@	.04
Khaki Cuttings.....	.02½	@	.03
O. D. Khaki.....	.03	@	.03¼
Corduroy	.02¾	@	.03
New Canvas.....	.06¾	@	.07¼
B. V. D. Cuttings...	.06¾	@	.07

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04¼	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues.....	1.75	@	2.00
Old Blue Overalls...	1.50	@	—
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings.....	3.90	@	4.00
Roofing Stock—			
No. 1.....	1.00	@	1.10
No. 2.....	.65	@	.70
No. 3.....	.45	@	.50

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....	.90	@	1.05
Dutch Blues.....	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians.....	2.25	@	2.50
Old Linsey Garments.	2.10	@	2.25
New Silesias.....	3.75	@	4.00

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phil.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.06½
New White, No. 2.	.03½	@	.04
Light Silesias.....	.03½	@	.04
Silesias, No. 1....	—	@	.04½
Black Silesias, soft	—	@	.03
New Unbleached..	.05½	@	.06
Washable, No. 1..	.01½	@	.01¾
Blue Overall.....	.04	@	.04½
Cottons—According to grades—			
Washable No. 2...	.01	@	.01¼
New Blue.....	.01	@	.01¼
Fancy Percales...	—	@	.02½
New Black Soft...	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.....	.03	@	.03½
No. 2 Mixed.....	.02	@	.02½
Corduroy	—	@	.02
New Canvas.....	.05	@	.05½
New Black Mixed.	.02½	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	2.75	@	3.00
Miscellaneous	2.00	@	2.25
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1.....	.90	@	1.10
Domestic No. 1...	.80	@	.90
Domestic No. 2...	.60	@	.65
Roofing Bagging...	.40	@	.45

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	—	@	1.50
Domestic	1.50	@	1.60
Manila Rope.....		@	3.00
Sisal Rope.....	1.50	@	1.75
Mixed Rope.....	.75	@	1.00
Scrap—			
No. 1.....	—	@	1.50
No. 2.....	.80	@	.90
Wool Tares, heavy..	3.25	@	3.50
Mixed Strings.....	.45	@	.50
No. 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 2 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White.	1.75	@	1.80
No. 2 Soft White.	1.30	@	1.40
No. 1 Mixed.....	.65	@	.75
Solid Ledger Stock..	1.45	@	1.50
Ledger Stock, white.	1.05	@	1.10
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy.	.60	@	.75
Manila Cuttings....	1.45	@	1.50
Print Manila.....	.45	@	.50
Container Manila...	.35	@	.40
Kraft Paper.....	.65	@	.70
No. 1 Mixed Paper..	.20	@	.25
Straw Board Chip...	.25	@	.30
Binders Board Chip.	.25	@	.30
Corrugated Board...	.50	@	.55
Overissue News.....	.40	@	.45
Old Newspapers.....	.30	@	.35

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White.	1.85	@	2.15
No. 2 Mixed.....	.75	@	.80
Solid Ledger Books..	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers.....	.85	@	.90
No. 1 Books, heavy..	.70	@	—
No. 1 Books, light..	.65	@	.75
Crumpled Stitchless Book Stock.....	.55	@	.65
Manila Env. Cuttings	1.70	@	1.85
Manila Envelope Cuttings, Extra Quality	2.00	@	2.10
No. 1 Old Manila...	.65	@	.70
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	.70	@	—
Mixed Papers.....	.15	@	.17½
Print Manila.....	.45	@	.55
Container Manilas..	.27½	@	—
Old Newspapers.....	.27½	@	.32½
Paper Wool Strings..	.60	@	.65
Overissue News.....	.45	@	.50
Box Board Chips....	.20	@	.25
Corrugated Boxes....	.30	@	.32½
Kraft corrugated boxes	.60	@	.65
Screening Wrappers.	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	[illegible]	@	2.65

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings....	1.80	@	1.90
No. 1 Hard White.	1.70	@	1.80
No. 1 Soft White..	1.50	@	—
Ledger & Writings..	.75	@	.80
Solid Books.....	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts.....	1.10	@	—
Manila Env. Cuts...	Nominal		
Ex. No. 1 Manila...	Nominal		
Print Manila	Nominal		
Overissue News.....	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Roofing Stocks—			
No. 1.....	1.00	@	1.05
No. 2.....	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White .....$	35.50	@	—
No. 1 Tints	36.50	@	—
No. 2 White	25.50	@	—
No. 2 Tints	26.50	@	—
No. 2 Golden Rod..	27.50	@	—
No. 3 White	21.00	@	—
No. 4 White	15.00	@	—
No. 4 Tints	16.00	@	—
No. 4 Golden Rod...	17.00	@	—

Direct mill shipment in three-ton lots

No. 5 White .....$	10.50	@	—
No. 5 Tints	11.50	@	—
No. 5 Golden Rod..	12.00	@	—
No. 6 White	9.00	@	—
No. 6 Tints	9.50	@	—
No. 6 Golden Rod..	11.00	@	—
No. 7 White	8.00	@	—
No. 7 Tints	8.50	@	—
No. 7 Golden Rod..	10.00	@	—
Book—			
No. 1 M. F. ..... $	7.00	@	—
No. 2 M. F.	6.50	@	—
No. 3 M. F.	5.35	@	—
No. 1 S. C.	7.25	@	—
No. 2 S. C.	6.75	@	—
No. 3 S. C.	5.85	@	—

Coated Book & Litho

Ton Lots (resale)

No. 1 .....$	12.00	@	—
No. 2	10.25	@	—
No. 3	8.90	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown.....	4.85	@	5.25
White Wrap.....	4.00	@	—
"B" Manila.....	4.90	@	6.15
No. 1 Manila.....	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2.....	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)..)$	46.00	@	—
Sheets	54.00	@	—

Pulp

Ground wood.....$	29.00	@	—
Unbleached sulphite.	44.00	@	—
Bleached sulphite...	54.00	@	—
Kraft	50.00	@	—
Soda	54.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.00	@	—
Soft White.....	1.75	@	—
White Blk. News..	1.25	@	1.10
Book and Ledger—			
Flat Magazine and Book Stock (old)	.70	@	—
Light and Crumpled Book Stock.	.60	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut...	1.35	@	—
Printed Manilas...	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue..	.50	@	—
Strictly Folded....	.45	@	—
No. 1 Mixed Paper..	.30	@	—

Domestic Rags

(Price to Mills, f.o.b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Light Prints.....	.03	@	.03¼